DLA-93-P20339

AUTOMATED INVENTORY MANAGER SUPPORT SYSTEM

May 1993

DEPARTMENT OF DEFENSE
DEFENSE LOGISTICS AGENCY
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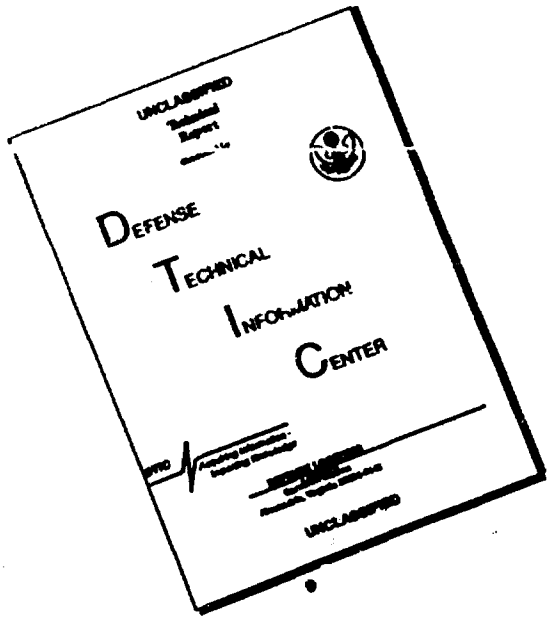

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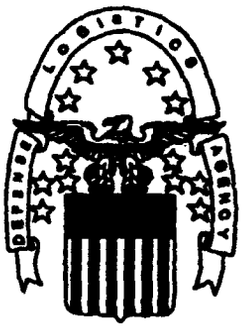

Defense Logistics Agency

Automated Inventory Manager Support System

Final Economic Analysis
May 1993

KPMG Peat Marwick

Management Consultants

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April 9, 1993

Ms. Jan Rider
Defense Logistics Agency
Building 3 Cameron Station
Alexandria, VA 22304-6100

Dear Ms. Rider:

KPMG Peat Marwick is pleased to submit our final report in accordance with task order F7-04 and Contract F33600-90-D-0223. This report details our analysis, assumptions, methodology, and results. All comments on the draft economic analysis have been addressed; the final economic analysis replaces the draft economic analysis.

We enjoyed performing the economic analysis on this very important topic and look forward to future efforts with DLA. A briefing, as required on the delivery order, can be scheduled at your convenience. If you have any questions or comments, please contact me at (202) 467-3015.

Very truly yours,

KPMG Peat Marwick

Laurence D. Huff, for
S. Daniel Johnson, Principal

ECONOMIC ANALYSIS OF THE AUTOMATED INVENTORY MANAGER SUPPORT SYSTEM

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ACRONYMS

ADP	Automated Data Processing
AIMS	Automated Inventory Manager Support System
AIS	Automated Information System
ALT	Administrative Lead Time
AMP	AIS Management Plan
CBU	Commodity Business Unit
CIM	Corporate Information Management
CIT	Consumable Item Transfer
CSIS	Central Secondary Item Stratification
DBMS	Database Management System
DCSC	Defense Construction Supply Center
DESC	Defense Electronics Supply Center
DGSC	Defense General Supply Center
DIMES	Defense Integrated Management Engineering System
DISC	Defense Industrial Supply Center
DLA	Defense Logistics Agency
DLA-LO	DLA Operations Research and Economic Analysis Office
DLA-Z	DLA Office of Information Systems and Technology
DLAM	Defense Logistics Agency Manual
DLAR	Defense Logistics Agency Regulation
DLR	Depot Level Reparable
DMINS	Distributed Minicomputer System
DoD	Department of Defense
DORO	DLA Operations Research and Economic Analysis Management Support Office
DPACS	DLA Pre-Award Contracting System
DPSC	Defense Personnel Support Center
DPSC (C&T)	DPSC-Clothing and Textile
DPSC (Med)	DPSC-Medical
DPSSO	DLA Performance System Standard Office
DRIVE	Distribution and Repair in Variable Environments
DSAC	DLA Systems Automation Center
DSC	Defense Supply Center
FSC	Federal Supply Class
FTE	Full Time Equivalent
GAO	General Accounting Office
GFM	Government Furnished Material

GS	General Schedule
GSA	General Services Administration
HQ	Headquarters
ICP	Inventory Control Point
IM	Inventory Manager
IOC	Initial Operating Capability
IPU	Integrated Processing Unit
LAN	Local Area Network
LAPER	Labor and Production Effectiveness Reporting
MAISRC	Major Automated Information System Review Council
MIPS	Millions of Instructions Per Second
MP&E	Maintenance Planning and Execution
MR	Management Requirement
MSO	Management Support Office
NIIN	National Item Identification Number
NSN	National Stock Number
OALT	Supply Administrative Lead Time
OMB	Office of Management and Budget
ORC	Output Routing Code
PALT	Procurement Administrative Lead Time
PDP	Project Development Plan
PGC	Procurement Group Code
PLT	Production Lead Time
PR	Purchase Request
RB	Recommended Buy
RDB	Requirements Data Bank
RDD	Required Delivery Date
RD & ES	Requirements Determination and Execution System
RFP	Request for Proposal
SAMMS	Standard Automated Materiel Management System
SAMMSTEL	SAMMS Telecommunication
SARD	System Analysis Requirements Document
SDF	Statistical Demand Forecast
SL	Safety Level
SMC	Small Multiuser Computer
SPD	Special Purpose Data
SSCS	Standard Supply Control Study
TLT	Total Lead Time

List of Exhibits

ECONOMIC ANALYSIS OF THE AUTOMATED INVENTORY MANAGER SUPPORT SYSTEM

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EXECUTIVE SUMMARY

This economic analysis of the Automated Inventory Manager Support System (AIMS) is one of three studies being provided to the Defense Logistics Agency (DLA) under KPMG Peat Marwick delivery order F7-04 of Contract F33600-90-D-0223 to assess economic viability of various components of SAMMS.

Our report is in accordance with the concepts of DLA Manual (DLAM) 7041.1, *Economic Analysis*, of May 1985, and Secretary of Defense *PA&E Draft Guidelines*, but is tailored to meet the following client specific requirements:

- analyze existing historic economic profiles of AIMS, which were prepared by DLA at various stages during system development,
- review system implementation through fiscal year 1992, and document actual system costs and, where possible, actual benefits realized, and
- project remaining implementation and recurring costs for the period fiscal years 1993 through 2001, and estimate benefits for the same period.

Following these descriptions, we provide comparisons and return on investment/payback calculations.

Introduction and background

AIMS is an on-line interactive system that automates the inventory management functions at the DLA supply centers. The system operates on a three-tier architecture - microcomputer workstations, minicomputer data repository, and IBM mainframe. Prototype development began in 1987. System initial operating capability (IOC) occurred in April 1990, at the Defense Industrial Supply Center (DISC). Currently, AIMS is fully installed at all the DLA supply centers.

Methodology

The study team researched a broad base of existing AIMS functional, statistical, and financial data. Extensive interviews were conducted with representatives from DLA Headquarters (HQ), DISC, the Defense General Supply Center (DGSC), and other Inventory Control Points (ICP). Continuous interaction was maintained with DLA AIMS users for data input, verification, clarification of assumptions, and interpretation.

The steps we followed in executing our study approach are paralleled in the organization of our report, which describes the AIMS premodernization economic profile, documents actual costs and benefits to date, and projects future costs and benefits.

Premodernization baseline

The study team was provided with historical documents, which describe, at different points in the AIMS development cycle, DLA's anticipated benefits of AIMS. Exhibit 1-1 summarizes the key points of the documents. As shown, estimates of personnel savings ranged from 26 to 165 full-time equivalents (FTE) after implementation of AIMS, and lead time savings ranged from 2.4 to 2.8 days. Documenting the estimated costs of AIMS that paralleled those benefits estimates proved difficult. The only document of the four provided by DLA for examination which contained any cost data was the Milestone I analysis conducted in December 1988. This study contained cost estimates for a total of 12 system modernization initiatives, of which

Exhibit 1-1
Summary of Benefit by Source Document ($ million)

Source	Date	Personnel Savings	Annual Cash Personnel Savings	Lead Time Savings	Anual Cash Lead Time Savings
1. AIMS Benefits to DISC	Dec. 1988	26 FTE	$0.8 recurring	2.8 Days	$4.0 non-recurring
2. SAMMS I 3 Milestone I (FY 88 $)	Dec. 1988	165 FTE	$4.9 recurring	2.8 Days	$5.5 non-recurring 1.0 recurring
3. SAMMS I 3 Milestone II (FY 90 $)	Mar. 1990	58.3 FTE	$1.9 recurring	2.4 Days	$5.5 non-recurring 0.9 recurring
4. SAMMS I 3 Milestone II Update (FY 90 $)	Oct. 1991	60 FTE	$2.0 recurring	2.4 Days	$2.0 non-recurring 0.4 recurring

AIMS was one. The I^3 analysis documented 3 different cost scenarios based on varying degrees of functionality, of which Alternative 2 most closely resembles the AIMS that was eventually developed. Costs in this report were aggregated, however, by functional element such as hardware, software, program management, etc. The only cost elements that differentiated requirements by individual system were hardware and, to a lesser extent, software development. The study team identified AIMS specific costs and allocated nonspecific system costs on the basis on the percent of AIMS identified costs to Alternative 2 identified costs to arrive at a macro estimate of total cost. Exhibit 1-2 is a summary of that allocation, identifying the incremental costs for the implementation of AIMS against the status quo baseline, which in the Milestone I document was presented as Alternative 0.

Exhibit 1-2
Summary of Original Estimate of AIMS Costs (FY 88 $000)

SAMMS Milestone I	
Milestone I, Alternative 2 Cost	$733,690
Milestone I, Alternative 0 Cost (Baseline)	543,059
Total Milestone I Incremental Cost	$190,631
Milestone I AIMS Incremental Cost	$41,779

Actual and future costs and benefits

Exhibit 1-3, is a summary of actual costs incurred through fiscal year 1992 and projected through fiscal year 2001, as well as anticipated benefits. Remaining investment costs are estimated to be primarily attributable to hardware replacement and hardware maintenance. Significant expenditures for software development, training, and travel will also be required as a result of hardware replacement plans that include a move from Unify to Oracle. Based on interviews, a review of standards, and an analysis of performance data, the study team projects annual savings to result from a reduction of 95 FTE in personnel and approximately 3 days of lead time for all DLA sites after full AIMS implementation occurred in fiscal year 1991.

Exhibit 1-3
Actual/Future Costs and Benefits (FY 93 $ million)

	FY 87-91	FY 92	FY 93	FY 94	FY 95	FY 96	FY 97	FY 98	FY 99	FY 00	FY 01	TOTAL	EXCL. SUNK
Costs													
Investment	$12.96	$1.73	$1.94	$2.47	$0.00	$0.33	$0.67	$1.32	$2.47	$0.00	$0.00	$23.90	$9.21
Recurring costs	2.63	1.05	1.05	0.91	0.91	0.92	0.91	0.43	0.35	0.36	0.48	9.99	6.31
Total Costs	$15.59	$2.78	$2.99	$3.38	$0.91	$1.25	$1.57	$1.75	$2.83	$0.36	$0.48	$33.89	$15.52
Costs (FY 93$$)	$17.88	$2.88	$2.99	$3.38	$0.91	$1.25	$1.57	$1.75	$2.83	$0.36	$0.48	$36.28	$15.52
Savings (FY 93$$)													
Personnel		$4.10	$4.10	$4.10	$4.10	$4.10	$4.10	$4.10	$4.10	$4.10	$4.10	$41.00	$36.90
Lead time (one-time)		0.68	0.51	0.20								1.39	0.71
Lead Time (Recurring)		0.05	0.10	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11	1.04	0.99
Total Savings		$4.83	$4.70	$4.42	$4.21	$4.21	$4.21	$4.21	$4.21	$4.21	$4.21	$86.87	$38.60
Net Savings/(cost)	($17.88)	$1.95	$1.72	$1.03	$3.30	$2.96	$2.64	$2.46	$1.38	$3.85	$3.73	$7.15	$23.08

Summary

A summary comparison of the previous benefits analyses is shown in Exhibit 1-4, alongside the costs from initial I[3] Milestone I document. A comparison of the costs and benefits to the study team's estimate is provided in Exhibit 1-5.

Exhibit 1-4
Historical Cost and Benefit Projections ($ million)

	Total	Excluding 1985-88	Excluding 1985-90
Incremental AIMS Cost (FY 88 $)	$41.8	$41.6	$26.1
FY 93 $$	$49.8	$49.6	$31.1
Milestone I Savings (FY 93 $)			
Total Benefits	$77.0	$77.0	
Net Savings/(cost)	$27.1	$27.3	
Discounted Savings/(cost)		$10.3	
Sunk cost years 1985-1988			
Milestone II Savings (FY 93 $)			
Total Benefits	$37.0		$37.0
Net Savings/(cost)	($12.9)		$5.9
Discounted Savings/(cost)			$7.0
Sunk cost years 1985-1990			
Milestone II (Update) Savings (FY 93 $)			
Total Benefits	$21.7		$28.4
Net Savings/(cost)	($21.4)		($2.7)
Discounted Savings/(cost)			$0.11
Sunk cost years 1985-1990			

Exhibit 1-5 is a comparison of key historical data and our revised profile. As shown, costs and benefits vary significantly between the older studies and our fiscal year 1993 update. Largely due to reduced hardware replacement and maintenance costs estimated from newer generations of computers on the mid and lower tiers, the current study estimates costs to be nearly 40 percent lower than original DLA estimates. Benefits are also estimated to increase over the Milestone II and Milestone II update as a result of analysis of detailed performance standard revision conducted by the DLA Performance System Standard Office (DPSSO). However, the Milestone I benefits were estimated to be significantly higher than all other analyses. This can be attributed to the fact that the Milestone I analysis included improvements in productivity resulting from AIMS, but did not address other impacts of the system.

Exhibit 1-5
Discounted Comparison ($ FY 93 million)

	Milestone I	Milestone II	Milestone II Update	1993 Actual/Projected
Cost	$49.6	$31.1	$31.1	$15.5
Benefits	77.0	37.0	28.4	38.6
Savings	$27.3	$5.9	($2.7)	$23.1
Discounted Savings	$10.3	$7.0	$0.1	$14.7
Payback (years)	4.9	5.4	9.9	2.9
Savings/Investment Ratio	1.4	1.7	1.0	3.2
Base Year	1988	1990	1990	1993
Sunk Cost Years	FY 85-88	FY 85-90	FY 85-90	FY 87-92

The Milestone I document estimated AIMS incremental cost at $49.6 million, fiscal year 1993 dollars, excluding sunk costs (fiscal years 1985-1988). At the same time, benefits were estimated at $77.0 million, fiscal year 1993 dollars, resulting in a net savings of $27.3 million, fiscal year 1993 dollars. When discounted to fiscal year 1988, the net present value was $10.3 million (fiscal year 1993 dollars). Furthermore, the Milestone I document estimated that the discounted payback would occur in 4.9 years (excluding sunk costs) and the savings investment ratio was 1.4.

The Milestone II document reduced total benefits by more than 50 percent to $37.0 million (fiscal year 1993 dollars), but did not address costs (we have extended the Milestone I estimate for illustrative purposes, but have expanded sunk costs to include fiscal years 1985-1990). The net discounted savings at this time equal $7.0 million, the savings to investment ratio rose to 1.7 and the discounted payback period increased to 5.4 years. It should be noted that the Milestone II analysis was only a benefits analysis. The results of the Milestone II analysis were never compared to existing cost estimates.

Typically, the internal rate of return is calculated to illustrate the relative profitability of a project. However, due to non normal cash flows (cash outflows in the outyears and cash inflows in the early years), multiple IRRs result for the Milestone II and Milestone II Update analyses. Therefore IRRs for the individual analyses are not presented

In the update to the Milestone II document, benefits were lowered by another 25 percent to $28.4 million (fiscal year 1993 dollars). Again, this analysis did not address costs, and again Milestone I costs (with fiscal year 1985-1990 as sunk costs) were used for illustrative purposes.

When discounted to fiscal year 1990, the net present value is $0.1 million. The discounted payback period was extended to 9.9 years. The savings investment ratio for AIMS fell further, based on these benefits estimates, to 1.0. It should be noted that the Milestone II analysis was only a benefits analysis. The results of the Milestone II analysis were never compared to existing cost estimates.

The results of the current analysis fall somewhere between previous analyses. Actual and future costs are estimated to total $15.5 million (fiscal year 1993 dollars, excluding sunk costs), and associated benefits are estimated to increase to $38.6 million (fiscal year 1993 dollars). The discounted payback is 2.9 years, and the savings to investment ratio increased to 3.2.

The most visible change in the economic indicators of AIMS is the decrease in benefits from the Milestone I to the Milestone II document. The benefits calculated for Milestone I were based on the elements of work measurement standards that decreased as a result of potential AIMS implementation. However, the Milestone I analysis did not address the possibility that other elements of the work standard could increase as a result of AIMS implementation.

While these data cannot be compared to each other because each analysis was performed at different points in time of the development life cycle, some points are evident. Because AIMS investment costs were not formalized in an analysis between 1988 and 1993, functional managers may not have had a clear picture of the costs and benefits of AIMS over time. At the present time, the AIMS baseline appears to show that total investment will be recouped though system benefits.

ECONOMIC ANALYSIS OF THE AUTOMATED INVENTORY MANAGER SUPPORT SYSTEM

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INTRODUCTION AND BACKGROUND

The objective of this study is to update the economic profile of AIMS implementation, and compare that update to previous historical economic estimates conducted at various stages in the development of the system. The general steps we take to accomplish this objective are to:

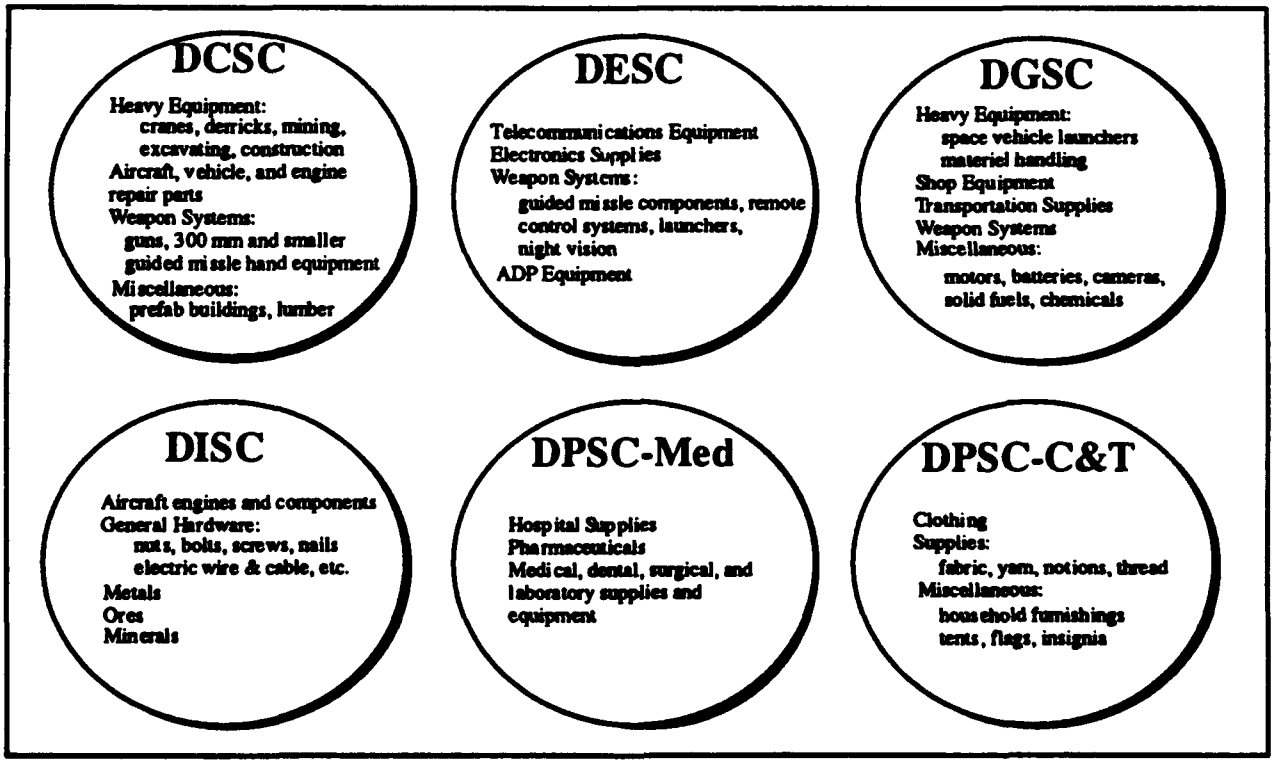
- identify, analyze, and discuss the historical government cost and benefit data related to AIMS. Historical cost and benefit data are provided in Section 4, Premodernization Baseline.
- research and document AIMS-related incurred costs to date (through fiscal year 1992). Analyze implementation experience at those sites operating AIMS and assess the benefits of the system operation. This discussion is provided in Section 5, Incurred Costs and Accrued Benefits.
- project future AIMS costs and benefits through fiscal year 2001 based on actual experience and forecasting analysis. Our projection is discussed in Section 6, Future Costs and Benefits.

The balance of this section provides a description of AIMS and an introduction to the DLA functions and processes impacted by the system.

DLA supply support mission

DLA manages, procures, and distributes approximately 3.5 million consumable items used by the military services and other Federal agencies. In acquiring these items, the agency awards over 1.2 million procurements annually. The first-tier infrastructure used to manage this effort, the DLA supply centers, is shown with each center's commodity responsibilities in Exhibit 2-1.

Exhibit 2-1
Supply Center Commodity Descriptions



In fiscal year 1991, the military services began transferring an additional one million consumable items to DLA to centralize distribution management. This transfer of items should be complete in fiscal year 1994.

Supply scope

Although AIMS operation peripherally affects procurement and contracting, quality assurance, and cataloging/technical services functions, the system primarily impacts the Directorate of Supply at each of the supply centers. Commodity inventory managers (IMs) within each Directorate of Supply are responsible for performing requirements analyses, which result in recommended buy (RB) decisions for their areas of responsibility. RB decisions are the first step in the purchase request, solicitation, and contract award cycle for resupply. Annually, approximately one million RB decisions are made across DLA.

Inventory management missions and functions

Although each supply center has its own Directorate of Supply with a site-unique organization and mission, the directorate's general mission does not vary considerably from site to site. DPSC manual 5810.1, part IV, defines the responsibilities of the DPSC Directorate of Supply: "Acts as principal advisor and assigned to the Commander in directing the accomplishment of responsibilities for providing contracting and production support, stock control, and inventory management of assigned items, supply support of authorized activities, development and administration of materiel and financial management programs, quality and reliability, cataloging, technical data, standardization, value engineering support and provisioning coordination."

Exhibit 2-2 outlines the basic structure of the DPSC Directorate of Supply and highlights the divisions that have been directly impacted by AIMS implementation. The Logistics Program Division receives the purchase materiel and distributes it to the appropriate requisitioner. The Stock Control Division controls stock of assigned items, provides assistance to requisitioners, and expedites action on critical items. IM responsibilities are performed at DPSC in one of the two Inventory Management Divisions.

Exhibit 2-2
Directorate of Supply Operations - DPSC

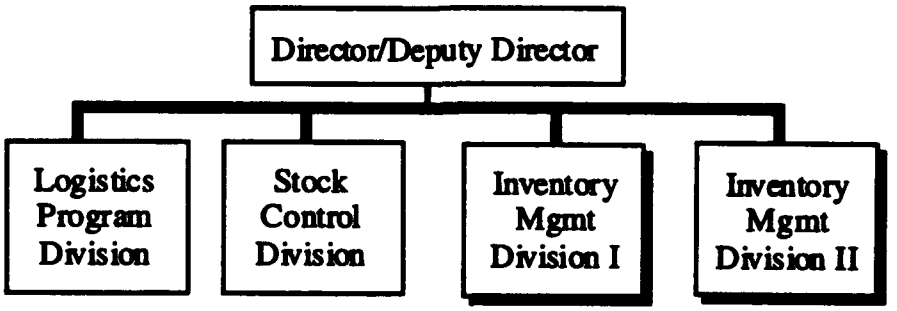
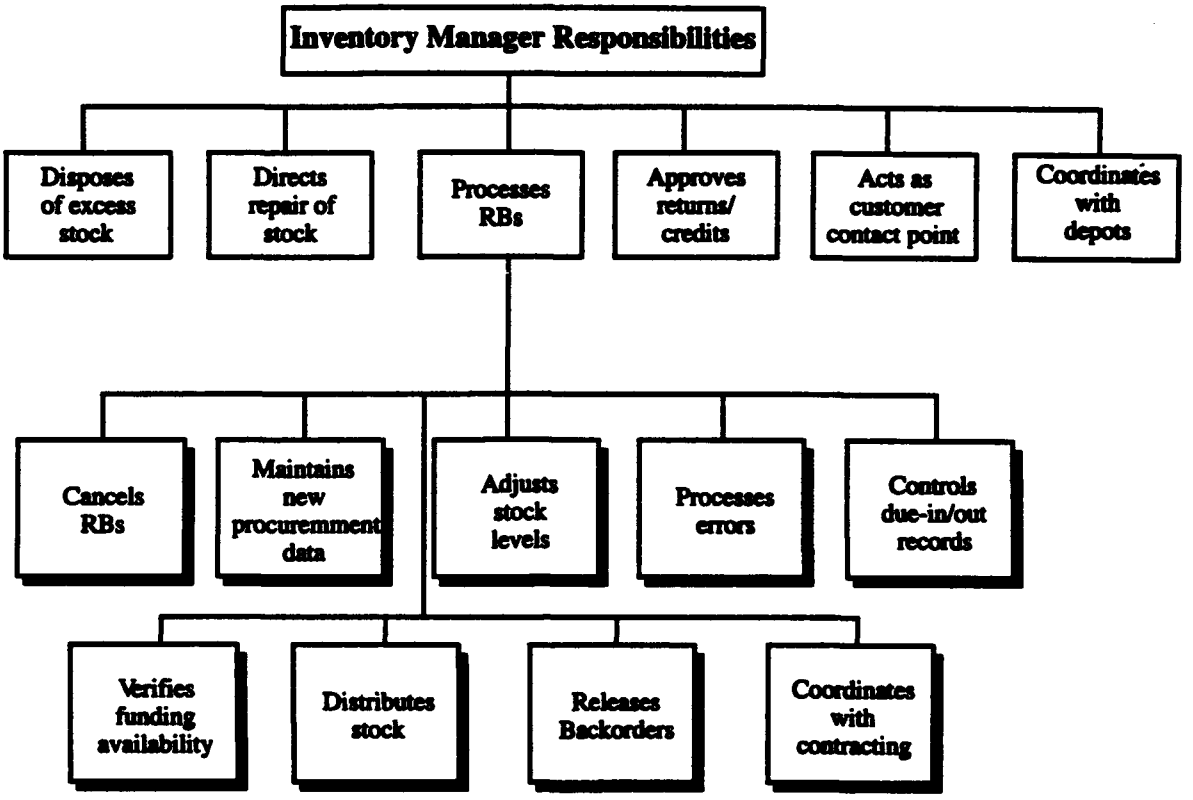


Exhibit 2-3 details the responsibilities of an IM and highlights responsibilities that have been directly impacted by AIMS implementation. As shown, processing RBs is an IM's primary responsibility and accounts for a majority of time spent during the work day. Prior to AIMS implementation, functions such as updating procurement data, adjusting stock levels, canceling RBs, processing errors, and releasing back orders were performed manually. All of the highlighted RB functions shown in Exhibit 2-3 are now performed electronically on AIMS.

Exhibit 2-3
Inventory Manager Responsibilities



Original plan for an inventory management system

In June 1987, DLA prototyped a system at DISC to determine the requirement for a personal workstation application to aid IMs. The new system, formerly called Increment 5 of the RB project and later re-named AIMS, was to be an on-line system that would provide for update and retrieval of data. This modernized process was to include a review of items to determine and identify potential back orders. IMs were to have standard supply control studies (SSCSs) displayed on their terminals on a real-time basis. The system was also to have a means of interfacing with a work measurement system that could collect specific work counts, a process that had formerly been performed manually. Studies were to be queued to allow for an even flow of workload to the IMs.

Internal to the supply organization, the system was to support the required signature level at each supply center. If an IM approved an RB in excess of his/her approved signature authority, the system would forward the RB to the appropriate branch chief or division chief for review and approval or disapproval. Management would be able to cut selected national stock number (NSN) levels in times of reduced funding, and simulate alternative decisions based on recommended supply control study actions. With these capabilities, the system could simulate the results of management approval in terms of supply support and stock fund implications and any impact from specific element on management-selected groups of items.

The system was designed to monitor the pending or queued SSCSs awaiting review by IMs, and provide summary information at the branch, division, and directorate levels regarding

queued workload processed on a daily, weekly, or monthly basis. The IM could also determine trend analyses for a defined time period.

Exhibit 2-4, on the following page, is a time line depicting the dates of actual AIMS implementation at the DLA supply centers. The Initial Operating Capability (IOC) dates are based on data provided by DLA-Z.

AIMS operational description

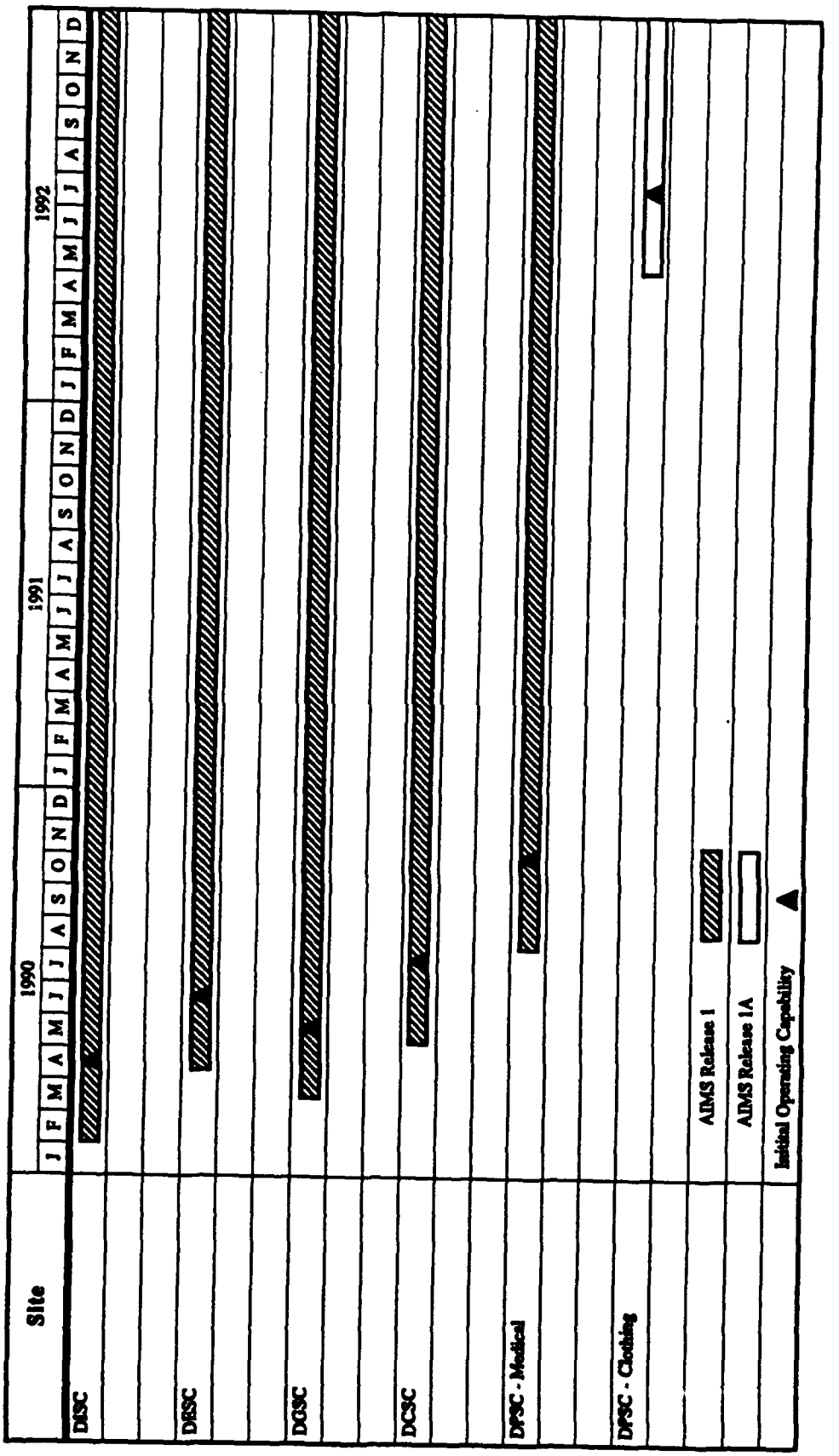
AIMS was developed in early 1988 as a result of this prototype exercise, to provide on-line access to DLA inventory information, reduce reliance on hard copy reports, automate manual procedures, provide on-line editing and validation of input, and improve information management and control.

AIMS is an on-line interactive system that automates RB decisions, review, approval, and recommendation functions at all DLA supply centers. All data required by an IM or supervisor are provided on-line. The IM can review RB data, access supporting information related to the buy, view depot data, and electronically refer the RB to outside sources. The system electronically refers RBs to a supervisor for on-line approvals. AIMS operates on a three-tiered architecture system. The lower tier consists of a microcomputer running under Microsoft's Disk Operating System (MS-DOS), the midtier consists of a Gould minicomputer serving as the main data repository, and the upper tier is an IBM compatible mainframe that runs the current SAMMS application. AIMS also includes components to perform the following tasks:

- back order inquiry
- history inquiry
- buyer information
- supervisor functions

A more detailed functional description is provided in Section 4 of our analysis.

Exhibit 2-4
AIMS Implementation Schedule



ECONOMIC ANALYSIS OF THE AUTOMATED INVENTORY MANAGER SUPPORT SYSTEM

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ANALYSIS METHODOLOGY

Our approach to conducting this study is to:

- identify, analyze, understand and reformat historical cost and benefit data associated with AIMS development and installation. DLA provided several documents and historical contextual inputs for this step.
- review the impact of AIMS implementation to date. Initial AIMS installation occurred in fiscal year 1991 at DISC, therefore, this site was the primary focus of the actual effect AIMS was having on the supply process.
- project the balance of costs to be incurred and benefits to be realized, based on actual observation of implementation to date.

Historical AIMS economic documentation

The study team identified several historical DLA documents that describe total or partial government estimates of costs to develop and implement AIMS, along with benefits that would be realized from system implementation. These source documents differed significantly in their assumptions, inclusion, planned project life, format, and extent of formal preparation. The following is a brief summary of each.

AIMS Benefits to DISC **(December 1988)**

This study was conducted by DISC personnel and used as a basis for the SAMMS I^3 Milestone I, document discussed below. This study did not address system implementation and operations costs but did identify reductions of 26 FTEs and 2.8 days in administrative lead time (ALT) as potential savings from AIMS at DISC.

SAMMS I^3 Milestone I, Concept Development Phase **(December 1988)**

This study was conducted to support the SAMMS I^3 Modernization Major Automated Information System Review Council (MAISRC) decision. Within this document, AIMS was one of 12 subsystems addressed as part of the SAMMS Improvement Program. Of all the documents the team reviewed, this Milestone I document was the only source of system cost data; however, cost was not organized by system (i.e., AIMS), but by function (i.e., hardware, software) for all systems. The next section of our report, Premodernization Baseline, describes our methodology for segregating AIMS costs from total costs and develops a cost stream that forms the basis for comparison of historical estimates of costs.

Benefits were identified and quantified by subsystem in the Milestone I analysis. AIMS savings estimates for personnel were approximately 165 FTEs and 2.8 days for ALT reduction.

I^3 Benefits Analysis, Milestone II **(March 1990)**

The benefits portion of the Milestone I document described above was updated in draft form for the SAMMS I^3, Milestone II, MAISRC. No systems cost data were included in this report. The Milestone II update reduced the personnel savings estimate from 165 to 58.3 FTEs and ALT was reduced from 2.8 to 2.4 days. At the time of the Milestone II analysis, the results were not compared to the costs obtained in the Milestone I analysis.

***Benefits Quantification for Enhancements to Selected Automated Information Systems* (October 1991)**

This unpublished draft study was an update to the Milestone II report previously discussed. This report was an attempt to quantify benefits based on new estimating information made available, and as such did not attempt to address system costs. It estimated an increased personnel reduction of 60 FTEs and maintained the 2.4 day ALT reduction estimates from the Milestone II report.

The above documents are referenced frequently throughout the balance of our report as they provide the basis for comparison in Sections 5 and 6 of what has happened and what is currently estimated to occur. Extensive interviews were conducted with DLA staff who were involved in preparing these studies to verify and confirm our interpretation of data.

Other data sources

Appendix A contains a list of all documentation reviewed during the course of this study to clarify the interpretation of the studies and analyze assumptions made by the study team for its estimates. The study team witnessed a live demonstration of the system, and analyzed functional descriptions, workloading statistics, and staffing plans. Interviews were conducted with AIMS experts at DLA Headquarters (HQ), DISC, DGSC, and several other supply centers. Interviews regarding cost assumptions and standards were held with DLA HQ, DLA Operations Research Office (DORO), and DLA Performance System Standard Office (DPSSO) personnel. A list of all personnel interviewed is provided as Appendix B.

Benefit estimation

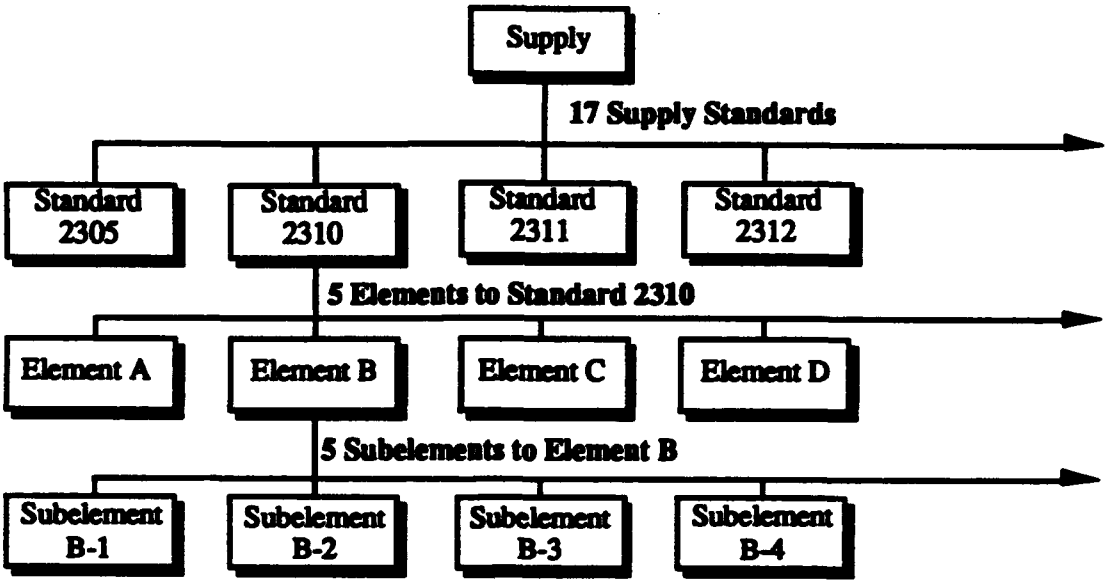
Our approach to estimating benefits was to document, where possible, actual changes in personnel and lead time, reconcile those findings with pre- and post-AIMS standards for those functions affected, and combine those findings with estimates and projections by key AIMS managers and users in the field to create valid estimates of future system benefits. We interviewed users who were knowledgeable about AIMS and users who were familiar with processes prior to AIMS implementation. This allowed the study team to identify differences in how tasks were performed manually and electronically with AIMS. The interviews generally focused on how the implementation of AIMS changed the way each supply center performed its workload.

Benefits quantified in this report are associated with identified costs. As DoD migrates to a CIM baseline system, additional costs will be incurred to transfer AIMS to a standard DoD IM system. The benefits included in this analysis correlate only to the costs (and functionality) specifically identified.

Standards

Among its many tasks, DPSSO develops and maintains work measurement standards. DPSSO performs classic time and motion studies of processes performed by DLA personnel, for a variety of functions (e.g., supply, contracting). Based on DPSSO's observations, activities are grouped into like categories, called standards, which consist of multiple elements. Each element is divided into subelements, which are in turn further divided. For example, the standard for the RB process consists of 18 elements, and element "B" is divided into five subelements. The RB standard is one of 17 standards for the inventory control point (ICP) organizations. The components of a representative standard are illustrated in Exhibit 3-1.

Exhibit 3-1
Components of DPSSO Standards



Actual performance of each element and each of its subordinate elements are observed, and a standard time is developed. The established time can be based on observation, time study tables, or other mechanisms. Once a time standard is developed, it is multiplied by a frequency of occurrence factor to arrive at a "normal" time. The frequency of occurrence is based on the number of times the element is performed during the entire process. As a result, DPSSO calculates a normal time that it should take to perform a given process. This time represents the DLA base time, and is modified at each ICP to adjust for activity-unique requirements and processes.

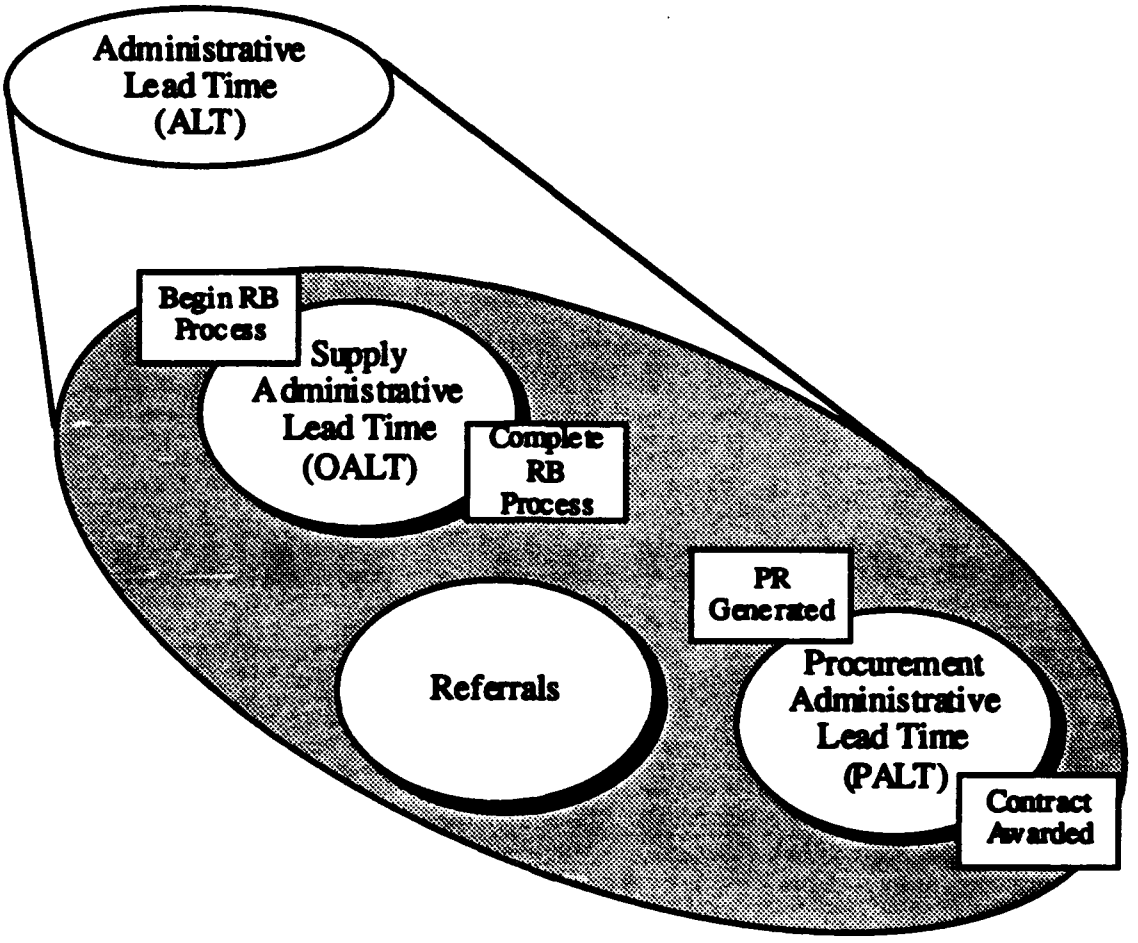
For the purposes of this analysis, DPSSO Standard 2310 was analyzed for the periods before and after system deployment. In doing so, we were able to observe which elements were eliminated and which functions reduced (or increased) the time required to perform given functions.

Lead time quantification

An element of the benefits associated with AIMS is the reduction of ALT. Exhibit 3-2 illustrates the main components of ALT as related to AIMS. ALT can be further subdivided in three main categories: Supply Administrative Lead Time (OALT), Referrals, and Procurement Administrative Lead Time. Implementation of AIMS directly and positively affects the duration of OALT.

This analysis assumes that a reduction in lead time to acquire an item results in a corresponding reduction in the safety levels of inventory required to be held on hand. The standard DLA analysis technique has been to identify the number of days of lead time saved and then assign a dollar value to the number of days of lead time saved. The economic effect is similar to that of selling an asset and having a one-time cash infusion. Thus, a one-time reduction in working capital is associated with the safety level reduction. The estimated value of one day of lead time has fluctuated widely in the historical studies reviewed.

Exhibit 3-2
Components of Lead Time



For purposes of this effort, DORO supported our study by updating input data for fiscal year 1991 and 1992 actuals, and recalculating per day lead time savings using the same approach used in their October 1991 benefits update. Exhibit 3-3 provides supporting detail for a per day savings of $1,143,714. In addition to one-time safety level savings, our study also assumes an associated recurring savings related to the one-time reduction in inventory. This recurring savings has been estimated at 8 percent annually; 1 percent for storage costs and 7 percent for obsolescence. Because we have adopted the working capital reduction methodology (the one-time savings), no recurring savings associated with investment costs were included.

While DORO supported the analysis by providing the one-time dollar per day of lead time savings, additional research was conducted by the study team to determine when the one-time savings would occur. Appendix C contains the DORO Lead Time Savings Analysis. Based on the October 1991, Benefits Quantification report, one-third of the one-time reduction was expected to be realized in the first year, one-fourth in the second year, and one-tenth in the third year. The assumption in the October 1991, report stated that, "These one-time savings occur gradually as DLA makes its first buys and then receives stocks for these items. Due to

long supply lead times, some of these stocks may never be bought again." The annual percent realized was based on old statistics obtained from DLA-OSF.

Exhibit 3-3
Dollar Value of a One-Day Reduction in ALT

Site	Current Safety Level ($000)	Reduced Safety Level ($000)	Safety Level Saved ($000)	Safety Level Reduction Per Day ($000)
DCSC	$5,389	$3,657	$1,732	$49
DESC	14,657	10,495	4,162	119
DGSC	10,687	7,398	3,289	94
DISC	20,910	16,162	4,748	136
DPSC-Med	8,227	5,472	2,755	79
DPSC-C&T	145,943	122,599	23,344	667
DLA	$205,813	$165,783	$40,030	$1,144

Because the environment surrounding the DLA purchasing and IM functions has changed dramatically over the past several years, the team held discussions with DLA Operations Research and Economic Analysis Office (DLA-LO) and DLA-OSF to determine when and to what extent one-time savings associated with decreased inventory levels would be realized. Based on current buying practices and use of inventory holdings, it was mutually agreed that 60 percent of the ratios identified in the October 1991, analysis would be realized. Exhibit 3-4 illustrates the time phasing used in this analysis.

Exhibit 3-4
Lead Time Phasing

	Year 1	Year 2	Year 3
October 1991	.333	.250	.100
Environment Factor	.600	.600	.600
Current Analysis	.200	.150	.060

Review of findings

Information gained from existing documents and separate interviews was compiled, organized, and summarized. This information was then reviewed with supply center personnel for adequacy and reasonableness. The results were presented both verbally and in written form to supervisors and functional managers. Further investigation was conducted as necessary to answer issues raised during the discussions. In an attempt to verify information to the widest degree possible, our findings were then circulated to section managers, branch managers, and operations analysts. In addition to reviews by functional personnel, data gathered during this analysis were also reviewed by representatives from DLA HQ.

Other general assumptions

Base year dollars

Historical cost benefit profiles are shown in the year dollar and timing schedules in which they were originally prepared and are clearly labeled. Current and future estimates and comparisons to other dollar streams are conducted in constant fiscal year 1993 dollars.

Sunk cost evaluated. Sunk costs are included for comparison purposes, although they are not included in the calculation of incremental system costs for financial indices.

Only incremental costs considered. In accordance with DLA Manual (DLAM) 7041.1, *Economic Analysis*, only incremental costs are considered in the analysis when determining future system costs; therefore, a cost that would occur equally with or without AIMS was not included. This is to permit a comparison of only the relevant costs and benefits.

Discount rate is 10 percent. In accordance with DLAM 7041.1, a 10 percent discount factor was used for this study. This rate is based on Office of Management and Budget (OMB) Circular A-94, which has been updated since the commencement of this analysis and now specifies various discount rates for different types of analyses. Because this analysis compares actual costs and benefits to DLA's original expectations of costs and benefits, and because those original estimates were developed using a 10 percent discount rate, the use of a 10 percent discount rate in this analysis will allow comparisons. However, in anticipation of future compliance with the updated Circular A-94, a summary of all cost and benefit data using a 3.4 percent discount rate is included as Appendix D . This rate was extracted from Appendix C of the revised Circular A-94. Since highly unusual inflationary pressures are not expected over the course of the analysis, no additional inflationary effects were incorporated into any part of this analysis.

Benefits loaded at 29.55 percent. Benefits were loaded on the fiscal year 1993 annual salaries at a rate of 29.55 percent, in accordance with DLAM 7041.1. The components of the 29.55 percent benefits loading are:

- 21.70 % retirement
- 1.45 % Medicare
- 4.70 % insurance
- 1.70 % other

Personnel

An average salary for a supply center was not calculated; rather, average salaries were applied to various job titles (i.e., IM, supply clerk, and supervisor). Fiscal year 1993 Federal government general schedule (GS), step 5 salaries were used in all calculations. In instances where hours were converted to FTEs to determine savings, an 18 percent factor was added to adjust for sick leave and vacation to ensure compliance with DLAM 4071.1. Fractional FTE equivalents were dropped and savings were rounded down to the nearest whole FTE by major job category within each site. The following are our assumptions regarding average GS levels for the major categories of job titles:

- inventory manager GS-7/GS-9
- supply clerk GS-4/GS-5
- supervisor GS-12

While general and administrative (G&A) costs may be reduced as a result of personnel savings identified in this document, G&A and other indirect costs reductions were not considered as part of this analysis.

Workload

AIMS has been in operation at DISC the longest (several years) of all the supply centers. Therefore, our investigation of workload associated with AIMS initially focused on DISC. In addition, workload data was analyzed for DGSC.

Steady state future workload. The extent of future real world changes that may affect the AIMS environment is not predictable with any degree of certainty. Therefore, this analysis assumes that the mission served by AIMS will proceed similarly to current operations, notwithstanding the perception that the Defense environment is changing. While issues such as force drawdowns and base realignment and closure are reducing current workload, most centers are increasing workload due to Phase 1 of the Consumable Item Transfer (CIT). While troop drawdowns may outweigh the impact of the CIT, troop drawdowns may only result in a lower quantity of goods requisitioned, not necessarily fewer requisitions. Therefore, this analysis assumes that the overall level of work performed on AIMS will remain relatively stable for the future.

Workload estimate. One component of this analysis is the volume of workload processed by the IM. As previously stated, AIMS assists the IM with some, but not all duties. In conjunction with our investigation of standards, DPSSO personnel provided automated work counts for Standard 2310. These work counts were extracted from the Labor and Production Effectiveness Reporting (LAPER) system and are presented in Exhibit 3-5. While DPSSO was able to provide most of the workload information, DPSSO's data were not complete. DPSSO relies on transmissions from each individual field activity. Gaps in data occur when a field activity does not provide data to DPSSO for a given month. In turn, the data were not provided to Peat Marwick. Therefore, the boxed areas in Exhibit 3-5 show that the average workload for the same fiscal year at the site was used for months in which data were not available. For example, DGSC's April data for fiscal year 1991 were unavailable; therefore, April data for fiscal year 1991 at DGSC were estimated using the other 11 months of fiscal year 1991 at DGSC, the estimates were checked for reasonableness.

Exhibit 3-5
AIMS Workload Data

		OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	TOTAL
DGSC	FY 92	18,230	10,796	6,229	11,321	7,016	13,935	12,192	8,411	7,918	24,162	12,569	11,566	144,345
	FY 91	13,683	8,271	7,440	12,787	17,035	16,492	12,929	12,010	9,310	23,417	11,275	10,499	155,148
	FY 90	22,064	11,200	13,774	14,492	15,782	10,983	12,971	9,665	7,654	7,987	13,011	14,489	154,072
DISC	FY 92	35,656	23,932	13,837	24,653	19,841	22,696	27,993	20,286	21,129	22,773	19,730	19,636	272,162
	FY 91	30,797	18,785	19,502	30,449	23,931	21,777	28,744	21,688	17,344	19,442	23,246	23,246	278,951
	FY 90	39,504	33,824	30,692	42,866	31,130	30,612	42,449	37,406	34,518	9,877	29,730	28,646	391,254
DPSC	FY 92	12,832	10,975	6,554	13,365	12,804	12,473	7,340	10,055	9,413	10,646	10,646	10,646	127,749
C&T	FY 91	9,040	9,271	6,244	7,294	10,581	13,763	8,208	8,590	6,119	8,887	12,152	8,336	108,485
	FY 90	1,318	1,604	1,293	1,643	1,493	1,660	1,477	1,407	1,253	13,035	12,424	12,887	51,494
DPSC	FY 92	4,109	3,244	2,664	3,472	3,609	4,926	4,733	3,736	4,262	3,862	3,862	3,862	46,341
MED	FY 91	7,380	6,692	4,813	6,151	3,923	4,998	4,518	3,837	3,507	4,909	2,861	2,494	56,083
	FY 90	4,270	3,655	3,180	4,343	3,262	3,376	3,784	3,926	3,515	6,491	6,153	5,744	51,699
DESC	FY 92	27,411	33,601	15,863	11,320	15,472	16,850	20,323	15,597	24,763	20,133	20,133	20,133	241,600
	FY 91	21,056	13,806	12,851	20,336	11,679	14,990	16,457	13,807	10,718	17,350	12,461	10,222	175,733
	FY 90	18,944	14,775	13,215	19,714	15,776	18,771	19,059	22,315	15,216	18,210	15,959	11,705	203,659
DCSC	FY 92	3,625	1,140	6,497	35,524	15,282	18,187	17,174	11,978	17,336	14,811	11,306	12,494	165,354
	FY 91	15,819	16,126	16,948	21,773	13,781	11,696	12,844	12,255	11,487	27,275	17,711	12,117	189,832
	FY 90	16,715	16,545	8,470	15,164	12,243	21,318	11,549	14,511	15,564	25,257	14,298	28,949	200,583
DLA	FY 92	101,863	83,688	51,644	99,655	74,024	89,067	89,755	70,063	84,821	96,387	78,246	78,337	997,551
	FY 91	97,775	72,951	67,798	98,790	80,930	83,716	83,700	72,187	58,485	101,280	79,706	66,914	964,232
	FY 90	102,815	81,603	70,624	98,222	79,686	86,720	91,289	89,230	77,720	80,857	91,575	102,420	1,052,761

* Boxed numbers are estimates.

Hardware/software

During the course of this analysis, assumptions were made regarding the maintenance of hardware and software. The following subsections outline those assumptions.

Hardware acquisition. During the course of this analysis, midtier and lower tier hardware is replaced. Because DLA has not analyzed the costs and benefits of the various available alternatives for hardware replacement, certain assumptions were made. Specifically, there are several ways the midtier Gould minicomputers can be replaced. One option would be to replace the Goulds with a HP minicomputer from the Navy PRC-HP contract. Another option would be to attempt to modify the Navy's contract to include Unify, thereby eliminating the need to port the system to Oracle. Lastly, DLA could replace its minicomputers with 486 PC file servers. Based on discussions with DLA, this analysis assumes that DLA will replace its Gould minicomputers with HP minicomputers, running Oracle's V7 RDBMS. The cost implications of this assumption are contained in section 6 of this report.

Microcomputers are also being replaced on five year intervals. Some microcomputers have been replace with 386s from the Desktop III Contract and others with 486s from the Army SMC Contract. For the purpose of this analysis, future replacement of microcomputers will be with 486s.

While replacing older technology machines, such as the Gould NP1s and Zenith 248s, with current technology such as the HP 9000/877 and the 486 processors, provides DLA with more current technology, these actions are considered replacements (technical upgrades), not enhancements. DLA-ZS provided this assumption based on current DLA-ZO plans.

Hardware maintenance. Because AIMS runs in a three-tiered architecture, maintenance costs exist for three levels of computing: mainframe, minicomputer, and microcomputer. At the mainframe level, no costs have been attributed to AIMS because mainframe maintenance is not an incremental cost. The mainframe will require maintenance with or without AIMS. At the minicomputer level, each site runs one minicomputer (Medical and Clothing and Textile share one minicomputer) dedicated to AIMS. The annual maintenance for this type of hardware was estimated based on DLA-Z analysis showing that average maintenance costs per minicomputer per year were $96,000 in the I^3 analysis and $120,000 at present due to the obsolete nature of most machines. Maintenance for new HP 9000/877 minicomputers was established using existing contract data identified in detail in Section 6 of this analysis. The maintenance expense associated with the microcomputers requires a more detailed explanation.

According to *PC Week*,[1] the average annual maintenance for microcomputers and peripheral devices (including printers) is approximately 5 percent of the investment cost. For a $3,000 microcomputer this represents $150 a year. This estimating tool was validated through additional sources. However, it was noted that expenses in the fourth or fifth year of the device's life would probably approximate 6 percent, owing to the age of the device.

For the purposes of this analysis, it was assumed that there would be no maintenance associated with the first two years of the useful life of a microcomputer or printer purchased after fiscal year 1991. This is based on the fact that DLA has been procuring from two contracts (Desktop III and SMC) that include a two-year warranty. It was further assumed that expenses in the third year of the unit's life would approximate 5 percent of the investment cost and the final two years of the five-year useful life would approximate 6 percent. Workstations procured prior to the Desktop III contract did not receive the benefit of a warranty and were

[1] PC Week, Vol. 5, Issue 43, page 70.

assumed to bear the 5 percent maintenance fee for each of the first two years of operation life. Exhibit 3-6 illustrates the maintenance cost per year for microcomputers and printers.

Exhibit 3-6
Microcomputer/Printer Maintenance Cost - Post FY 91

Year 1	Warranty
Year 2	Warranty
Year 3	5 percent of investment
Year 4	6 percent of investment
Year 5	6 percent of investment

Software acquisition. Based on the assumptions contained in the hardware acquisition portion of this section of the report, certain software acquisition assumptions were developed. Because DLA will acquire minicomputers from a contract that comes with Oracle, it is assumed that Oracle's run-time version will be acquired at the same time.

Software maintenance. As a result of AIMS implementation, software maintenance at DLA Systems Automation Center (DSAC) has increased. Owing to DLA's cost collection procedures, the actual amount of labor associated with software maintenance was unavailable. In order to estimate software maintenance, two sources of information were pursued: the SAMMS project development plan (PDP) and interviews. Maintenance is tracked in the SAMMS PDP for SAMMS as a whole (including AIMS). The total effort budgeted for the current PDP for maintenance and customer assistance was 210 work months, or 17.5 FTEs. Based on interviews with DSAC personnel, it was determined that AIMS accounts for approximately 5 percent of the budgeted SAMMS workload, which translates to just under one FTE. For the purpose of this analysis, it was assumed that, beginning in fiscal year 1991, one FTE was associated with AIMS software maintenance at an annual burdened cost of $67,870 in fiscal year 1993 dollars.

ECONOMIC ANALYSIS OF THE AUTOMATED INVENTORY MANAGER SUPPORT SYSTEM

CONTENTS

PREMODERNIZATION BASELINE

This section describes the functional processes that comprise supply, discusses planned AIMS application to those processes, and documents DLA's original estimates of the costs and benefits of the system.

Functional processes of supply

Prior to AIMS, SAMMS printed hard copy Standard Supply Control Studies (SSCS) each requirements cycle. The studies are a product of the requirements subsystem of SAMMS, which runs two times a week at most centers. The requirements computation is initiated as a result of a scheduled quarterly computation, a directed computation, an IM-requested computation, stock levels falling below the reorder point, the occurrence of a back order, or one of a variety of other conditions. These studies were printed in the operations support centers where they were eventually distributed to clerks in the supply area. Once in the supply area, clerks sorted the studies by the output routing code (ORC) on the study and entered them in a control log (if required). Eventually, all studies were passed to the appropriate IM.

Once in the possession of the IM, the studies were again sorted by priority or stock class. The IM then attempted to check study data for reasonableness. If the data were deemed to be old by the time the IM looked at them, the IM would go to the SAMMS Telecommunication (SAMMSTEL) system to "refresh" the data. This would provide updated data if the study was indeed outdated, which would be incorporated into the IM's decision. After the IM analyzed the data and decided to make a buy, the IM would take the buy to his/her supervisor and wait for approval, if required. If the supervisor did not approve the buy, the IM would start over by getting more data and correcting any errors. Once a buy was approved and sent back to the IM, the IM forwarded the SSCS to clerks who keypunched the required data into a IV Phase terminal. After data entry was complete, the SSCS was returned to the IM for filing.

If supervisor approval was not required, the IM would determine if the SSCS should be detained. If no detention was required, the buy was processed in the same manner as a buy requiring supervisor approval. If detention was required, the SSCS was filed and keypunched by a clerk, then uploaded to SAMMS during the next cycle.

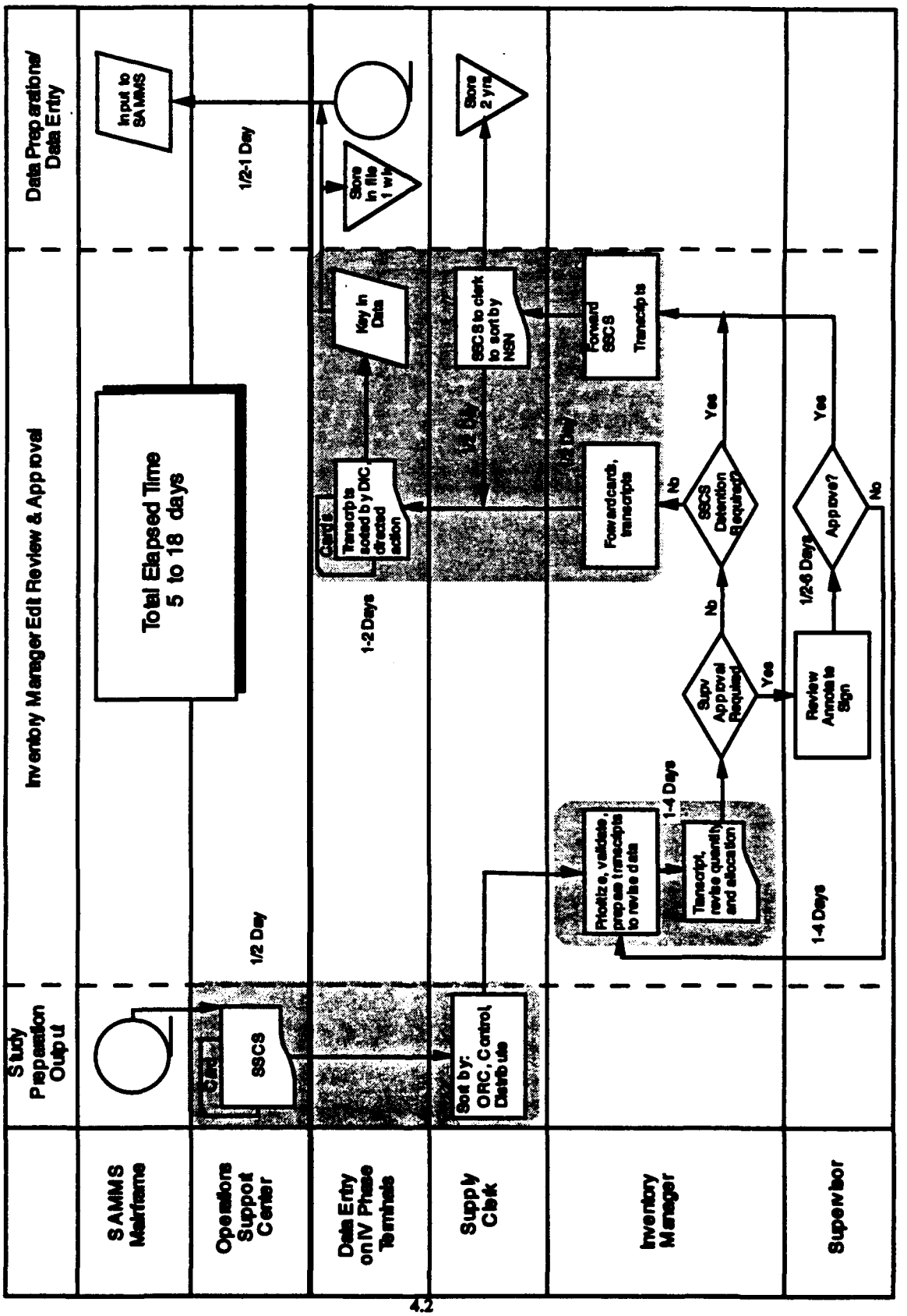
According to a 1986 study conducted at DISC, the RB process took between 5 and 18 days. An overview of the supply control study process described above is illustrated in Exhibit 4-1.

The SSCS was produced on demand, on a scheduled basis, or when triggered by events or criteria established in the management policy table. The SSCS contained all of the data considered essential to understanding an item's current status such as demand history, requirements levels, and assets. An RB was generated to support the requirements for every procurement group code item.

Supply control

As described above, SSCS processing represented one of the major efforts on the part of IM personnel at the supply centers. These documents were the basis for the most significant decisions made by the IM in terms of customer support and stock fund management. SSCS data reviewed by the IM represent the entire spectrum of item identification data including demand history, system level assets, requirements calculation, depot level analysis including requirements calculations, projected procurement and receipts, detailed on-hand data including condition code visibility, and detailed dues-in data.

Exhibit 4-1
Standard Supply Control Study Before AIMS



The shaded regions represent areas most affected by the AIMS system.

RBs that qualified under the low value procurement criteria bypassed IM review. Instead, internal transactions were created to establish the approved RB record in the dues-in file, and internal procurement transactions were prepared and passed to the contracting subsystem. A hard copy listing was provided to the IM so that he/she could check the reasonableness of the procurement. According to one source, 99 percent of the low value procurements were accepted by the IMs.

The AIMS concept

The original concept for AIMS involved creating a system that provided greater visibility into the stock replenishment process in order to reduce ALT and attain optimum stock availability and supply effectiveness.

In June 1987, DLA initiated development of a prototype system at DISC to determine the requirement for a personal workstation application to aid IMs. This was formerly called Increment 5 of the Recommended Buy project and was later renamed AIMS. An initial test was conducted at DISC from July 1988 to July 1989, with final system certification in April 1990.

Supply control objectives

AIMS has several supply control process improvement objectives. AIMS will help develop security routines to prevent unauthorized access/update to on-line data. It will also increase the number of remote terminals, which will allow direct inputting of SAMMS documents, increased interaction between users and data, simultaneous updating of data with a single entry, and reduced hard copy printout. AIMS will also allow users to accumulate and provide access to a sufficient amount of demand data to allow analysis of that data (frequency and quantity) and to develop an appropriate forecasting methodology for use in conjunction with other pertinent item data (e.g., special programs, related NSN deletions, program-oriented data). It allows the user to immediately update data elements through workstations and cause recompilation of these elements as required by management (mobilization requirements, forecasts of demand, safety levels, lead times, excess return rates, etc.). AIMS provides the capability to set levels on selected groups of NSNs independent of others in order to treat items differently at a given time and under a given circumstance. It also expands necessary management policy tables to individual Federal supply class and/or homogenous groupings by high, medium, and low value status. Included in this concept is a general management category code matrix and a security routine to prevent unauthorized access to the tables.

A summary of the anticipated benefits of AIMS implementation includes:

- error reduction
- clerical workload reduction
- lead time and safety level reduction
- increased accuracy
- IM workload reduction
- improved forecasting
- simulation capability

Original estimates of costs

Initial estimates of AIMS development and implementation costs were included as part of a detailed cost analysis of the SAMMS I^3 performed in December 1988, by DLA to support Milestone I, the Concept Development Phase. AIMS was identified and analyzed as one of the many I^3 initiatives under four alternative implementation profiles. Alternative 2 of the *I^3*

Cost/Benefits Analysis most accurately depicts the configuration that was ultimately developed and implemented. Cost data for all alternatives in the report were presented as totals for all components of the I^3 initiative for the period from fiscal year 1985 to fiscal year 2000. Most cost categories, especially government personnel activities, were not presented as bottom-up estimates flowing from specific need to quantity of people required, but instead were an allocation of the total complement of DSAC labor on hand. Those not working on development or program management were assumed to be involved with software maintenance. This tended to overstate total expected life cycle costs. Benefits data, on the other hand, were presented for each of the individual systems within I^3. Data contained in this section were taken from original government documents and **do not** represent actual costs incurred.

It should be noted that the I^3 Cost/Benefits Analysis estimated the cost to design and implement the AIMS that exists today; the I^3 report did not include the costs or benefits that would occur if a DoD standard system was designed and implemented.

Exhibit 4-2 summarizes the costs for the total SAMMS I^3 Alternative 2 option, and the corresponding costs estimated to be attributable to AIMS within that total. Costs shown are the incremental cost of AIMS. They were derived by subtracting Alternative 0 (the baseline) from Alternative 2. Appendix E contains the incremental cost and quantity detail from the I^3 Milestone I report.

Exhibit 4-2
AIMS Summary Cost
I^3 Original Estimate (FY 88 $000)

SAMMS Milestone I	
Milestone I, Alternative 2 Cost	$733,690
Milestone I, Alternative 0 Cost (Baseline)	543,059
Total Milestone I Incremental Cost	$190,631
Milestone I AIMS Incremental Cost	$41,779

Costs in all options were identified as sunk costs for the fiscal years 1985 to 1988. An attempt was made to segregate purely AIMS-related costs from the remaining I^3 costs in all cost categories. For most cost categories, AIMS-specific costs were extracted by analyzing the backup data and appendices found in the original report. Where AIMS-specific data were not available, and unit cost data were available, those data were used to extract AIMS portions of SAMMS total costs based on identified procurement quantities. Where data were presented only as a cumulative SAMMS I^3 cost and unit costs were not identified (e.g., SAMMS I^3 DSAC software development), an allocation method was used to extract AIMS data. Lacking any other rationale, the study team identified lifecycle costs specifically attributable to each of the five systems in Alternative 2 and a percent of the SAMMS total was computed based on these specific costs. AIMS accounted for approximately 21.9 percent of the SAMMS total. This apportioning factor was applied to areas such as program management, technical and integration support, test and evaluation, and recurring costs where unit cost and AIMS-specific data were not presented. Exhibit 4-3 summarizes the AIMS costs identified from the report, segregating them by function. Appendix E details the identified costs and the methodology for arriving at total implementation costs. The remainder of this section details the values and the methodology that were used to determine AIMS costs.

Exhibit 4-3
AIMS Total Costs and Rationale (FY 88 $000)

	Including Sunk Cost	Rationale
Incremental Alternative 2	$190,631	
Estimated AIMS Incremental	$41,779	
Hardware	24,245	Unit Cost on replacement cycle
Software	5,626	Allocation, Unit Cost
Software Documentation	254	Allocation
Test and Evaluation	522	Historical Unit Cost
Technical/Integration Support	902	Allocation
Program Management	360	Allocation
Other	4,102	Unit Cost, Level of effort, Allocation
Support Investment	1,987	Unit Cost, Allocation
Investment	$37,998	
Recurring Costs	$3,780	Allocation, Unit Cost

Total may not add due to rounding

Investment

Investment costs in the original AIMS cost estimate represent one-time costs attributable to initial AIMS implementation and deployment and any capital goods replacement during the period of the analysis. Where possible, identified unit costs were used as the basis of investment analysis. Where costs other than unit costs were identified in the *I³ Cost/Benefits Analysis,* total SAMMS I³ costs were apportioned to determine AIMS-specific amounts. Total investment for AIMS was originally estimated to be $41.78 million dollars in constant fiscal year 1988 dollars through fiscal year 2000, as detailed in Appendix E. The following subsections address the original estimate of investment for AIMS hardware, software, test and evaluation, technical and integration support, program management, etc.

Hardware. Hardware costs were estimated using unit costs from DLA contracts that existed at the time of the analysis for commercial procurement of Distributed Minicomputer System (DMINS), workstations, nonimpact printers (NIPs), and 20 node local area networks (LANs). All initial hardware procurements were to have occurred prior to fiscal year 1992. The cost analysis assumed that full replacement of DMINS would occur after eight years of operation and all workstations would be replaced after a five-year operational life. This appears to have been borne out, as the Zenith Z-248 80286 computers are currently being upgraded to 80386 IBM compatibles. Full NIPS replacement was also estimated on a five-year cycle. LAN replacement was assumed to occur on an eight-year cycle at 25 percent of original purchase price to upgrade network cards and software. DMINS, workstation, and NIP replacement costs were estimated to be equal to the original purchase price, with no reduction for resale value at time of excessing. Using this replacement profile, total hardware investment costs were identified at $24.25 million over the time frame of the analysis. (See Appendix E for detailed breakout).

Software. Software development for AIMS included both contracted and in-house government effort. In-house government software development sunk costs and labor years through fiscal year 1988 for each component of the SAMMS I³ effort were identified. Estimates of total SAMMS effort were identified, based on DLA's assumption that 55 percent of the I³-related DSAC staff would be involved in software development during those years. Using the percentage of total SAMMS software development sunk cost attributable to AIMS (21.9 percent), software development estimates were allocated from total SAMMS estimates for those years.

As with commercially procured hardware, investment costs for commercial off-the-shelf (COTS) software were extracted using unit costs identified from then current contracts for workstation software and DMINS software. Procurement costs were estimated to occur at the same time as identified hardware procurement schedules, with new software also being procured during each hardware replacement cycle. Combining government and COTS estimates over the period of the I³ analysis, total software investment costs were estimated to be $5.6 million. (See Appendix E for detailed breakout).

Software documentation. DLA's analysis assumed that 10 percent of all SAMMS-related DSAC staff would be involved in creating documentation during fiscal years 1989 and 1990. The allocation of total SAMMS cost to AIMS that was utilized in the analysis of software development costs was used to extract AIMS-related software documentation costs from the total SAMMS software documentation costs presented in the I³ report. Commercial documentation for workstation software (ENABLE) and DMINS commercial software was aggregated on a unit cost basis for full documentation purchased during software and hardware repurchasing intervals. Total government and commercial software documentation investment was estimated to be approximately $0.25 million over the life of the analysis. (See Appendix E).

Test and evaluation. Test and evaluation costs in the original AIMS estimate included effort for software and hardware testing. Testing for government-developed SAMMS software was estimated in the same manner as government software development and documentation costs. It was assumed that 20 percent of SAMMS-related DSAC staff would test software during fiscal years 1989 and 1990. For the purposes of extracting AIMS-specific costs, this same ratio was also applied to the total software test and evaluation costs. Costs for testing the DMINS and workstations were estimated using unit costs developed from past DLA experience. To attain specific AIMS costs these unit costs were applied to specified hardware procurement quantities, including replacements. Total AIMS test and evaluation costs of $0.52 million were estimated for the period of the I³ analysis. (See Appendix E).

Technical/integration support. Costs for government hardware and software integration were estimated using a similar methodology as that used to determine test and evaluation costs. The 21.9 percent apportioning factor used previously was applied to determine AIMS-specific costs. SAMMS total cost estimates for fiscal years 1989 and 1990 were generated on the assumption that 10 percent of the SAMMS-related DSAC staff would provide integration and technical support services. It was assumed that hardware contractors would provide in-place integration services for all hardware procurements and replacements at unit costs from then current DLA contracts. As a result, total technical and integration support costs for the period of the analysis were estimated to be $0.90 million. (See Appendix E).

Program management. The *I³ Cost/Benefits Analysis* estimated SAMMS program management costs by taking total DLA Office of Information Systems and Technology (DLA-Z) staff and apportioning them based on the percentages of workstations and DMINS under DLA-Z attributable to SAMMS in fiscal years 1988 and 1989. It was then assumed that the costs for fiscal years 1990 and 1991 would increase to 75 percent of the DLA-Z total for

fiscal year 1989 and maintain that level through the period of the analysis. The AIMS to SAMMS ratio of 21.9 percent was applied to these total costs to develop AIMS program management costs, which totaled $0.36 million over the time frame of the analysis. (See Appendix E).

Other investment costs. The original AIMS cost estimate included a cost category entitled "Non-SAMMS staff support" for fiscal years 1985 through 1991. A SAMMS share was developed by dividing the total number of non-AIS resources at DSAC by the total number of AISs supported (seven). To determine the AIMS share of these costs, the previously derived apportioning relationship was used to arrive at the estimate of $4.10 million attributable to AIMS. (See Appendix E).

During fiscal years 1989 and 1990, contractor costs for site preparation for initial DMINS installation were estimated using a then current unit cost of $50,000 per DMINS, for a total cost of $0.25 million for installation of five DMINS. Initial commercial and government training costs were also identified to occur through fiscal year 1990. Contractor-provided workstation and DMINS hardware and software training were calculated based on unit costs identified in the *I³ Cost/Benefits Analysis* derived from DLA historical data. Government training support was estimated to involve the remaining 5 percent of the SAMMS-related DSAC staff during fiscal years 1989 and 1990, and the percentage attributable to AIMS was applied to this estimate and are included in the total.

Recurring costs

The original AIMS cost estimate as interpreted from the *I³ Cost/Benefits Analysis* included estimates of cost for continuing government software and hardware maintenance, miscellaneous ADP supplies, and recurring training.

The *I³ Costs/Benefits Analysis*, DLA did not estimate software maintenance by system. Therefore, the previously described method of allocating incremental costs (AIMS to Alternative 2 ratio of 21.9 percent) was applied. This resulted in an incremental cost reduction of $9.67 million in fiscal year 1988 dollars over the period of this analysis. A large portion of these savings is attributable to software and hardware maintenance. The savings is the result of the I³ methodology assumed that all SAMMS-related DSAC staff would revert to software maintenance on a full-time basis after completion of software development, software documentation, test and evaluation, and technical and integration support for initial AIMS deployment.

Similarly, AIMS government hardware maintenance was assumed to require a fixed level of cost based on DLA fiscal year 1990-1991 budget estimates. Of this fixed level, the AIMS portion was calculated using the percentage relationship described above. Contracted software and hardware maintenance was calculated using unit costs applied to total AIMS DMINS, workstations, NIPS, and LANs in operation during a given year. Total hardware maintenance costs were $8.04 million over the period of the analysis. Incremental recurring training was calculated on a unit cost basis, assuming that each workstation had a single operator who required a given amount of training at a certain cost during each year. This totaled $5.0 million in fiscal year 1988 dollars. The resulting total recurring cost was $3.78 million for the period studied in the analysis.

Original estimates of benefits

While the SAMMS I³ Milestone I analysis was our primary source of historical AIMS cost data, several sources were found that quantified benefits of the system. Exhibit 4-4 is a summary of those sources followed by a discussion of each. Appendix F contains the narrative

Exhibit 4-4
AIMS Benefits - Summary by Source
($ million)

Source	Date	Personnel Savings	Annual Cash Personnel Savings	Lead Time Savings	Anual Cash Lead Time Savings
1. AIMS Benefits to DISC	Dec. 1988	26 FTE	$0.8 recurring	2.8 Days	$4.0 non-recurring
2. SAMMS I 3 Milestone I (FY 88 $)	Dec.1988	165 FTE	$4.9 recurring	2.8 Days	$5.5 non-recurring 1.0 recurring
3. SAMMS I 3 Milestone II (FY 90 $)	Mar. 1990	58.3 FTE	$1.9 recurring	2.4 Days	$5.5 non-recurring 0.9 recurring
4. SAMMS I 3 Milestone II Update (FY 90 $)	Oct. 1991	60 FTE	$2.0 recurring	2.4 Days	$2.0 non-recurring 0.4 recurring

of the expected benefits described in the October 1991 DLA document entitled *Benefits Quantification for Enhancements to Selected Automated Information Systems*.

Personnel savings

According to the *Milestone I Analysis*, AIMS would reduce the number of steps required for IMs and clerks to process an RB and automate many of the remaining tasks, which would reduce the amount of necessary labor. Calculations for the quantification of these savings were performed by DISC-LRS using Defense Integrated Management Engineering System (DIMES) special purpose standards data for task completion prior to, and after AIMS deployment, assuming constant workloads. These savings were aggregated to determine the total workload reduction in labor years per fiscal year in IM and clerk labor categories. A reduction of 165 FTEs was originally estimated in the Milestone I Document, of which 36 were clerks and 129 were IMs. The main function/category for benefits can be summarized as follows:

- 77 FTE - "refreshment" (updating SSCS)
- 39 FTE - transaction generation and edit/validation
- 22 FTE - sorting
- 19 FTE - distribution/filing
- 8 FTE - recomputation

For salary purposes, annual savings were estimated by DLA assuming IMs to be GS-9, Step 5, and clerks to be GS-4, Step 5 and GS-3, Step 5, all with relevant benefits. Annual savings after fiscal year 1991 were estimated to be $4.89 million, for a total of $48.94 million (fiscal year 1988 dollars) through fiscal year 2000. Because this analysis only considered elements of the standards that decreased, without addressing the elements of the standards that increase, savings may have been overstated.

A further analysis of estimated benefits was performed as part of the I^3 Milestone II effort. The *I^3 Benefits Analysis, Milestone II*, dated March 27, 1990, estimated personnel savings in fiscal year 1990 dollars based on the "AIMS Cost/Benefits Analysis" performed by DISC and verified by management at other centers. The Milestone II document estimated that AIMS would reduce 47.3 FTE IMs and 11.0 FTE clerks DLA-wide beginning in fiscal year 1991. Assuming that IMs were GS-9, Step 5 and clerks were GS-3, Step 5, annual cash savings of $1.70 million in fiscal year 1990 dollars were estimated. Beginning in fiscal year 1992,

additional benefits from AIMS implementation at DPSC in the Clothing and Textile inventory areas were estimated to increase the annual savings to $1.93 million.

In October 1991, the Milestone II analysis was updated in draft form and titled *Enhancements to Selected Automated Information Management Systems*. Based on the methodology and data from the Milestone II document, this analysis estimated that initial personnel savings would be 48 FTE IMs and 12 FTE clerks, with an estimated savings of $1.76 million. This would increase to $1.97 (fiscal year 1990 dollars) million in fiscal year 1992 with AIMS Release 1A's incorporation of Medical and Clothing and Textile commodities. Both represent only slight increases from the previous study in March 1990.

Administrative lead time

The time required to process an RB accounts for approximately 10 percent of total ALT. Safety levels of stocked items are held in part because of the amount of lead time required to acquire an item. By reducing ALT, AIMS will reduce the safety levels of stocks, which will result in both immediate and long-term savings.

One-time savings. The immediate reduction in the RB processing time which reduces ALT, would result in a one-time reduction in the safety levels held by DLA. In the Milestone I analysis, savings from this reduction were originally estimated to come from a 2.8 day reduction in ALT. One day of ALT was estimated to save $1.95 million, in constant fiscal year 1988 dollars, based on DORO Project Number 7003, *The Cost of Late Delivery*. The total savings to occur in fiscal year 1991 from the initial 2.8 day reduction in ALT were therefore estimated at $5.47 million.

The Milestone II benefits estimate document updated this analysis, predicting a 2.2 day reduction in ALT in the first year of AIMS implementation, fiscal year 1991. With the distribution of AIMS Release 1A in fiscal year 1992, DLA estimated an additional .2 day reduction in ALT in fiscal year 1992. Savings in fiscal year 1991 were estimated to be $4.98 million, and in fiscal year 1992, $0.51 million, for total nonrecurring savings of $5.49 million from one-time reductions in safety levels. In the October 1991 update, DLA revised the estimated savings per-day-figure and used the PERMES model to time phase the projected savings. As a result of this update, the value of a one-day reduction in lead time decreased to $1.24 million for a total savings of $2.02 million for 2.4 days. The October 1991 analysis assumed that only 68 percent of the one time savings would be realized (68 percent of $1.24 million x 2.4 days).

Recurring benefits. The reduction in ALT that leads to a reduction in the safety levels will also result in an annual holding cost reduction for the lower safety levels. In the Milestone I document, it was estimated that the holding cost savings per NSN per day would be $0.72. For a one-day reduction in ALT, savings were estimated at $0.35 million. For the 2.8 day reduction in ALT that was estimated for AIMS, this was expected to result in a $0.98 million savings each year, beginning in fiscal year 1991. These annual savings would total $9.83 million, through fiscal year 2000.

This recurring savings estimate was updated in the I^3 Benefits Analysis, Milestone II, to reflect an ALT reduction of 2.2 days in the first year of AIMS operation, and a further .2 day reduction in the second year. Based on the 1988 DORO methodology, the recurring savings in the first year, fiscal year 1991, were estimated to be $0.80 million. In fiscal years 1992 through 2001, savings were estimated at $0.90 million annually.

The October 1991 benefits update document revised these safety level savings estimates, breaking them down over the initial four years of implementation. Recurring savings were

estimated to be 18 percent of the one-time savings. One percent was attributed to storage, 7 percent to obsolescence, and 10 percent to investment avoidance. During the first three years after AIMS implementation, savings were estimated at $0.16 million, $0.30 million, and $0.36 million, respectively. With final AIMS-related safety level reductions in the fourth year after implementation, annual holding costs savings were estimated to be $0.37 million.

Summary

Exhibit 4-5, on the following page, provides a summary of historical cost and benefit data segregated by source document.

Exhibit 4-5
AIMS Historical Economics

($ million)

	FY 85-88	FY 89	FY 90	FY 91	FY 92	FY 93	FY 94	FY 95	FY 96	FY 97	FY 98	FY 99	FY 00	Total	Excluding 1985-88	Excluding 1985-90
Incremental AIMS Cost (FY 88 $)	$0.2	$9.4	$6.1	$1.1	$1.1	$1.2	$6.2	$1.5	$1.1	$2.8	$4.3	$5.8	$1.1	$41.8	$41.6	$26.1
FY 93 $$	$0.2	$11.3	$7.2	$1.3	$1.3	$1.4	$7.4	$1.8	$1.3	$3.4	$5.1	$6.9	$1.3	$49.8	$49.6	$31.1
Milestone I Savings (FY 93 $)																
Total Benefits				$13.6	$7.0	$7.0	$7.0	$7.0	$7.0	$7.0	$7.0	$7.0	$7.0	$77.0	$77.0	
Net Savings/(cost)	($0.2)	($11.3)	($7.2)	$12.3	$5.8	$5.6	($0.4)	$5.3	$5.8	$3.6	$2.0	$0.1	$5.8	$27.1	$27.3	
Discounted Savings/(cost)		($10.7)	($6.3)	$9.7	$4.1	$3.6	($0.2)	$2.8	$2.8	$1.6	$0.8	$0.1	$1.9		$10.3	
Sunk cost years 1985-1988																
Milestone II Savings (FY 93 $)																
Total Benefits				$8.4	$3.7	$3.1	$3.1	$3.1	$3.1	$3.1	$3.1	$3.1	$3.1	$37.0		$37.0
Net Savings/(cost)	($0.2)	($11.3)	($7.2)	$7.1	$2.4	$1.7	($4.3)	$1.3	$1.8	($0.3)	($2.0)	($3.8)	$1.8	($12.9)		$5.9
Discounted Savings/(cost)				$6.7	$2.1	$1.3	($3.1)	$0.9	$1.1	($0.1)	($1.0)	($1.7)	$0.7			$7.0
Sunk cost years 1985-1990																
Milestone II (Update) Savings (FY 93 $)																
Total Benefits				$3.2	$3.5	$3.0	$2.7	$2.7	$2.7	$2.7	$2.7	$2.7	$2.7	$21.7		$28.4
Net Savings/(cost)	($0.2)	($11.3)	($7.2)	$1.9	$2.2	$1.6	($4.7)	$0.9	$1.4	($0.7)	($2.4)	($4.2)	$1.4	($21.4)		($2.7)
Discounted Savings/(cost)				$1.8	$1.9	$1.2	($3.4)	$0.6	$0.8	($0.4)	($1.2)	($1.9)	$0.6			$0.11
Sunk cost years 1985-1990																

ECONOMIC ANALYSIS OF THE AUTOMATED INVENTORY MANAGER SUPPORT SYSTEM

CONTENTS

INCURRED COSTS AND ACCRUED BENEFITS

This section describes the functions and operations of AIMS as implemented, actual costs incurred through fiscal year 1992, and an analysis of accrued benefits.

AIMS current functionality

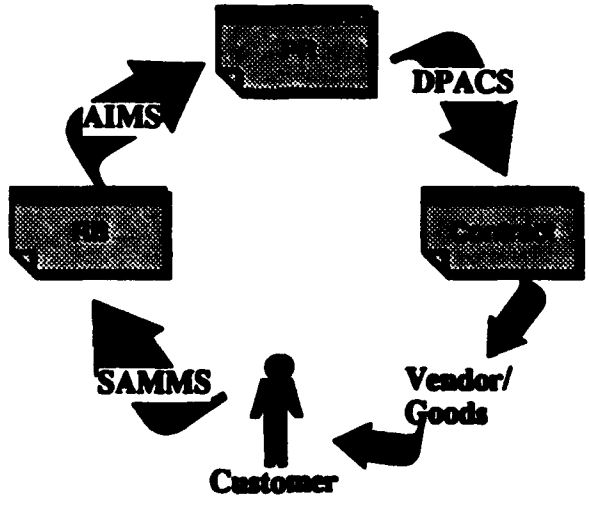
The AIMS system is a distributed application that uses all three hardware tiers to assist the IM in processing RBs. AIMS interfaces with SAMMS to extract RB information at each of the supply centers, the information is passed to a minicomputer and eventually to the IM's workstation. The IM performs certain functions as described below, and buys are eventually approved or canceled. These actions are then passed back through the minicomputer to the mainframe (SAMMS), and then to procurement.

Based on management estimates, 90 percent of the RBs are processed by AIMS in a typical manner as described below. The remaining 10 percent represent processing by DLA Form 710, DLA Form F-106, Military Interdepartmental Purchase Request (MIPRs), repair items, manual walk throughs, and follow-up actions.

Two major types of workload are performed on AIMS. GS-9s are responsible for a large volume of smaller RBs (totaling less than $50,000) and GS-11s are responsible for a smaller volume of high dollar value RBs (greater than $50,000). Typically, a GS-9 will process approximately 200 RBs a week and a GS-11 will process approximately 40 RBs a week.

The IM workload is downloaded twice a week as a result of the SAMMS requirements cycle. When customer requisitions are received, SAMMS performs calculations to determine buy requirements. These requirements are passed to AIMS in the form of RBs. Exhibit 5-1 illustrates the life cycle of a customer's request for goods.

Exhibit 5-1
Customer's request for goods



The IM begins the day by logging on to the AIMS system and accessing the RB main menu, which contains the options available to the IM. The first list on this screen is for the RB queue, which displays the RBs that the IM is responsible for processing. Each IM is generally

responsible for specific commodities grouped by Federal stock class, e.g., cable, wire, and associated materials.

The IM requests the RB queue and selects an RB. The IM can then select several screens that contain detailed information regarding the chosen RB. The IM reviews each screen for reasonableness and makes appropriate changes. The following paragraphs describe the most commonly viewed screens.

NSN management screen

The NSN Management Screen provides the IM with general information such as item name; standard price; quarterly forecast demand; RB quantity and value; repair quantity; age of the item; safety level code; production lead time; quantity on hand, back ordered, and dues-in; procurement cycle; and minimum buy quantity. In addition, this screen provides the IM with the demand history including total quantity and frequency of purchase for current month, current quarter, previous four quarters, and a total. The IM can then go to additional screens to obtain more detailed information on any of the items listed above.

Requirements summary screen

The requirements summary screen consists of a summarized list of the requirements for the particular items or time periods and the assets available for use. This screen also contains two windows, which display assets and nonrecurring requirements for quick, more detailed information.

Depot analysis screen

The depot analysis screen is an extension of the NSN management screen and provides more detailed information regarding the depots. This screen displays current monthly and quarterly demand, total four-quarter demand, total requirements, and total assets at each depot requiring the item. It also contains the delivery and repair schedule for the depots. This screen is used to allocate the RB delivery quantity by depot.

Additional NSN management information screen

The additional NSN management information screen contains, for the most part, all header information pertinent to a specific RB that is not on the NSN management screen. For example, quarterly forecast demand, ALT, production lead time, ship quantity, unit cube, unit weight, demand cut off, and safety level. Ship quantity, for example, is used in conjunction with depot analysis to ensure a full truckload is going to a depot. The IM reviews this screen for reasonableness and then continues to the next screen.

Detailed demand history screen

The detailed demand history screen aids IMs in determining if the quantity of an item should be changed. This screen contains a list of demand quantities by service, and gives a history of the previous four quarters' activity and the quantity demanded by each service.

Back order summary screen

An IM uses the back order summary screen to make certain the RB is not a duplicate request. This screen contains a summary of back orders by depot, direct delivery and provides a total of all back orders.

Recommendations screen

The recommendations screen contains quantities and courses of action for various recommendation categories along with information concerning actions taken on an RB by authority level. The action taken on a particular RB will be documented along with the date of action and initials of the person initiating the action at a specific hierarchical level. On this screen, the IM can approve the buy, cancel the buy, or suspend the buy. Once the IM has approved the buy, it is put on hold until the next SAMMS requirements cycle is initiated, assuming no approval is necessary. Once the buy reaches SAMMS, it is funded, if appropriate funds are available, and sent to procurement. If there are errors, the RB is returned to the original IM for correction. There is also an electronic notebook located on this screen for the IM to annotate any points of interest or reasons for any changes.

Other screens

Approximately 10% of the RBs processed require additional information. This information is provided on various screens within AIMS, depending on the commodity. The following is a brief description of the screens.

The weapon system screen contains detailed information on items pertaining to weapon systems listed by system and designator code. The provisioning screen contains detailed information pertaining to provisioning buys and commodity and is listed by National Item Identification Number (NIIN) and support date. The IM responsible for the NSN can view this screen to gather information on when the item was purchased, who requested the purchase, quantity demanded, and who processed the RB. This screen can also be used to determine if a back order exists; if there is a back order, it may be a duplicate RB. The current stock-on-hand screen contains detailed information relating to on-hand stock and is listed by NIIN, condition code, and depot.

The dues-in asset screens are three different screens listed by NIIN and contain quantity, depot, and status of the item dues-in. The dues-in screen provides the IM with the opportunity to analyze the validity of the dues-in quantity; the contract screen contains detailed information on asset dues-in under contract; the purchase request screen contains dues-in information under purchase request. The other screen contains the balance of the dues-in in the following sequence: approved RBs, unapproved RBs, redistributed orders, customer excess orders, and remaining dues-in.

The depot back order screen is a more detailed screen than the summary back order screen. This screen contains information on depot back orders, and is listed by back order type, priority and date established. The direct delivery back order screen contains more information than what is provided in the summary back order screen, including detailed information on direct delivery back orders, listed by priority and date established.

Based on interviews with IMs and observation of the system in operation, the study team noted the following points:

- although all information necessary to begin the RB process is available on AIMS, some centers are still reviewing and utilizing hard copy SSCSs. The IMs observed at DGSC were still using the SSCS cards and did not begin processing an RB until the SSCS was received. AIMS contains all data available from the hard copy SSCS, plus additional information required in the RB decision.
- according to several IMs interviewed at DISC, approximately 50 percent of the SAMMS notifications to start the RB process are resulting in either a combination with an ongoing transaction, or are deemed to not be required. This is due largely to better visibility of data available on AIMS.

Incurred costs

Source data for incurred cost aggregations included historical budgets, executed contracts, previous incurred cost accumulations, and interviews with DLA staff.

Investment

Initial development effort and development hardware procurements for AIMS began in fiscal year 1987. All sites had received initial AIMS hardware prior to fiscal year 1992. In that year, however, following JLSC direction an AIMS reengineering effort began. This effort should allow AIMS to be incorporated as part of the DoD Materiel Management system as it had been selected during the CIM process.

Hardware procurement. Production hardware procurements for AIMS began in fiscal year 1988, with all sites receiving the initial complement of 80286 microprocessor-based personal computer workstations. LAN hardware, software, and printers were procured in the following year for most sites. In addition, DISC received a development Gould 9050 minicomputer in fiscal year 1988 and two AT&T 3B2 minicomputers in fiscal year 1990 to serve as AIMS hosts, DGSC received a Gould DMINS as a host for AIMS in fiscal year 1990. DPSC has procured one minicomputer to host AIMS at both ICPs, although actual costs and date of implementation were not available for incorporation into this analysis.

In fiscal year 1992 development hardware (486s configured in different manners) was purchased from the Army Small Multi-user Computer (SMC) Contract for CDA personnel. Costs for this hardware were $271,751.

Hardware replacement. In fiscal year 1992, 290 of the DISC workstations were excessed and replaced with 80386 computers procured from the Army SMC contract at a cost of $0.79 million. An additional $0.17 million was spent at DSAC for development of DMINS upgrades.

Software procurement. Software for the CDA development suite to support the AIMS reengineering effort was purchased with the development minicomputer in fiscal year 1992. A run-time version of Oracle V.7 RDBMS was purchased from the Navy minicomputer contract. Other commercial-off-the-shelf hardware was also procured for the new minicomputer at this time. Total software costs in fiscal year 1992 were $273,785.

Software development. Software development was undertaken by DLA personnel at DSAC and DISC. Hardware and software procurements at DISC in fiscal year 1987 were to support the system development effort. Beginning in fiscal year 1991, contractors were utilized to provide postimplementation support services. As a result, the development costs of the AIMS software applications are not easily quantifiable, since effort was performed by government personnel not specifically dedicated to AIMS development.

Actual costs for development and implementation of AIMS were determined based on an Initial Major Information Systems Report for AIMS dated September 30, 1991, and further discussions with appropriate DLA personnel. During fiscal year 1987 the government employed approximately 5 FTEs in development and invested $0.13 million in capital equipment. The majority of software development took place in fiscal years 1988 and 1989, during which time DSAC and DISC employed 18 and 15 FTEs, respectively, and procured $4.12 million and $2.87 million for workstations, DMINS, and LAN hardware. Development tapered off in fiscal year 1990 with only nine FTEs involved in development and $0.78 million of capital investment. This trend continued in fiscal year 1991 with approximately 7 FTEs involved in development. Total costs for development through fiscal year 1991 were $3.20 million.

Labor costs for each year were calculated based on the number of work months of effort occurring during the year multiplied by a leave factor to determine FTEs. Annual costs were calculated by applying an actual average labor rate and fringe benefits factor.

AIMS was selected as part of the larger Materiel Management system during the CIM process. As a result, JLSC has directed that AIMS be reengineered to convert AIMS to a SQL compliant system. Phase I of this reengineering effort began in fiscal year 1992, using FMSO personnel at the CDA during fiscal year 1992 at a total cost of $0.28 million.

Other costs. During fiscal year 1992 DSAC and FMSO personnel were used to provide training to ICP personnel at the sites where AIMS has been implemented. Total training labor costs were $90,000, and travel costs associated with that training and with the AIMS reengineering effort added another $26,000 in direct costs in fiscal year 1992.

Recurring costs

Hardware maintenance. Due to DLA's cost collection methodology, actual hardware maintenance costs were not available. AIMS costs were estimated based on current industry standards and contract data were possible. Industry standard estimates of personal computer and NIPs maintenance costs average between 5 and 6 percent of original purchase price on an annual basis for the life of the computer. A wider discrepancy in the maintenance costs for LANs exists due the varying nature and complexities of the networks. As a result, a conservative figure of 8 percent of purchase price was assumed for annual maintenance costs in this analysis. These figures were applied to the actual costs for each hardware component procured for AIMS beginning in the procurement year. Maintenance of Gould minicomputers was estimated at $120,000 per machine based on conversations with DLA personnel. Actual maintenance contracts were not available at the time of this analysis.

Software maintenance. Since AIMS software was in the development phase part way through fiscal year 1991, DSAC personnel were not performing maintenance on the software prior to fiscal year 1991. Beginning in fiscal year 1991, DSAC estimates that 1 FTE has been specifically attributable to maintaining AIMS operability at the 6 ICPs.

Summary. When the $10.68 million for hardware procurement is added to the $3.80 million of government system design and development costs, and $0.22 million of site preparation and training costs to date, total investment through fiscal year 1992 equals $14.69 million. With 1,151 users on-line by the end of fiscal year 1992, this translates to $12,765 per user for hardware and commercial software, and $15,959 per user for all recurring and nonrecurring costs. To date, no costs for test and evaluation, technical/integration support, program management, or recurring operations have been identified as being directly attributable to AIMS. Exhibit 5-2 provides a summary of the known incurred costs that have been identified as being directly attributable to AIMS implementation, with further detail provided in Appendix G.

Exhibit 5-2
AIMS Costs to Date
($000 Actual)

	FY87	FY88	FY89	FY90	FY91	FY92	Total
Investment							
Hardware	$121	$4,022	$2,873	$2,424	$173	$1,064	$10,677
Software	307	980	830	499	628	550	3,795
Other - Site Prep, Training, Travel	0	100	0	5	0	116	221
Total Investment	$428	$5,102	$3,703	$2,928	$801	$1,730	$14,693
Recurring Costs							
Software Maintenance	0	0	0	0	68	68	136
Hardware Maintenance	6	147	484	926	997	980	3,541
Total Recurring	$6	$147	$484	$926	$1,065	$1,048	$3,677
Total	$434	$5,249	$4,187	$3,854	$1,866	$2,779	$18,369

Accrued benefits

Implementation of AIMS has already shown an impact by reducing the number of FTE staff processing RBs, and by reducing product acquisition lead time. In quantifying these benefits, the following sources of information were analyzed:

- performance standards
- interviews
- management data

Performance standards were analyzed for indicators of time requirement changes to complete an RB processing element before and after AIMS operation. Interviews were conducted with users to verify the impacts of quantified standard changes and solicit other quantifiable inputs of AIMS impact. Performance data were analyzed to correlate standard and interview-derived data points to arrive at reasonable estimates of savings. These benefits are a result of actual costs incurred; no benefits have been identified as a result of future development.

Performance standards

As discussed in Section 3, Analysis and Methodology, SPD standards were analyzed to assess changes in time required for buy functions resulting from AIMS. There are 17 different standards covering the various supply processes. One of these, Standard 2310, is for processing a procurement action (or processing an RB). For the purpose of evaluating the RB standard, two versions of the standard were analyzed; one compiled in March 1988, and the other in September 1991. The changes in the two standards captured changes in the supply process owing to AIMS implementation. Standard 2310 includes only a portion of an IM's workload; however, for the purpose of determining the impact AIMS has had on the functions of, and time required for, processing an RB, the SPD Standard 2310 before and after AIMS implementation provides an indication of changes in the processes.

The 18 elements of Standard 2310 have been divided into five sections. Exhibit 5-3 illustrates the elements of Standard 2310 in 1988 and 1991. The following subsections provide a description of the pre- and post-AIMS RB process and perceived benefits as a result of AIMS implementation.

Section I. Section I includes clerical tasks. These activities involve sorting and distributing system-generated buys to the IM. The time required to perform these tasks has been reduced significantly as a result of AIMS implementation.

Prior to AIMS implementation, a significant amount of both IM and supply clerk time was spent on clerical functions involving the movement of paper from one location to another. Supply clerks received, sorted, and distributed daily IM workload. Each morning, clerks obtained SSCS, DLA Form 710 (low value procurement listing), and RB/repair cards. The clerk manually sorted the various documents by control number or IM responsibility, then appropriately distributed the documents. Some documentation required special tracking and was logged into a control ledger. The DPSSO standard for these processes indicates that a clerk spent 11.4 minutes performing these tasks for every 100 RBs. Upon receiving the documents from the supply clerk, the IM had to review and sort the material to determine a work plan and prioritize his/her workload. This process took approximately 20.4 minutes per 100 RBs.

With AIMS implementation, this clerical element of the standard has been eliminated, since the sorting and distribution functions are now performed by AIMS. In total, AIMS automation has resulted in the elimination of 11.4 minutes of clerical workload and 18.0 minutes of IM workload per 100 RBs. As a result, the time required to accomplish the same task by an IM was reduced to only 2.4 minutes per 100 RBs. Exhibit 5-4 illustrates the changes in these processes.

Exhibit 5-3
Elements of Standard 2310 (1988 v. 1991)

PRE-AIMS - March 1988	POST-AIMS - September 1991
Section I	Section I
A. Receive, control, distribute mail	
B. Receive, sort mail	A. Receive, sort, distribute mail
Section II	Section II
	B. Review RB Queue
	C. Review NSN management data
	D. Review requirements
C. Analyze/Process DLA Form 710	E. Review depot analysis
D. Analyze/Recompute DLA Form 690	F. Review recommendations screen
E. Process repair cards	G. Analyze/process DLA Form 710
F. Process F-106 w/DLA Form 710 or 690	H. Process repair items
G. Process DLA Form 690	I. Process F-106 provisioning requirement
Section III	Section III
H. Process manual PR/walk-through	J. Review RB returned from higher level
I. Higher review and/or approval required	K. Process follow-up actions to buys
J. Process follow-up actions to buys	L. Process MIPRs
K. Process MIPRs	M. Process manual PR/walk-through
Section IV	Section IV
L. Process cancellation/modification to PR	N. Process cancellation/modification to PR
M. Process termination/modification/diversion	O. Process termination/modification/diversion
N. Process other related supply actions	P. Process other related supply actions
Section V	Section V
O. Sort, control, forward mail/data inputs	Q. Process mail/data inputs
P. File	R. File documents

Section II. Section II elements of Standard 2310 describe the analytical and review process necessary to complete RBs. Activities include the review of the RB queue, NSN management data, and recommendations. The IM must also review depot analysis, back order information, demand history, and multiple other screens to determine the appropriate specifications for the RB.

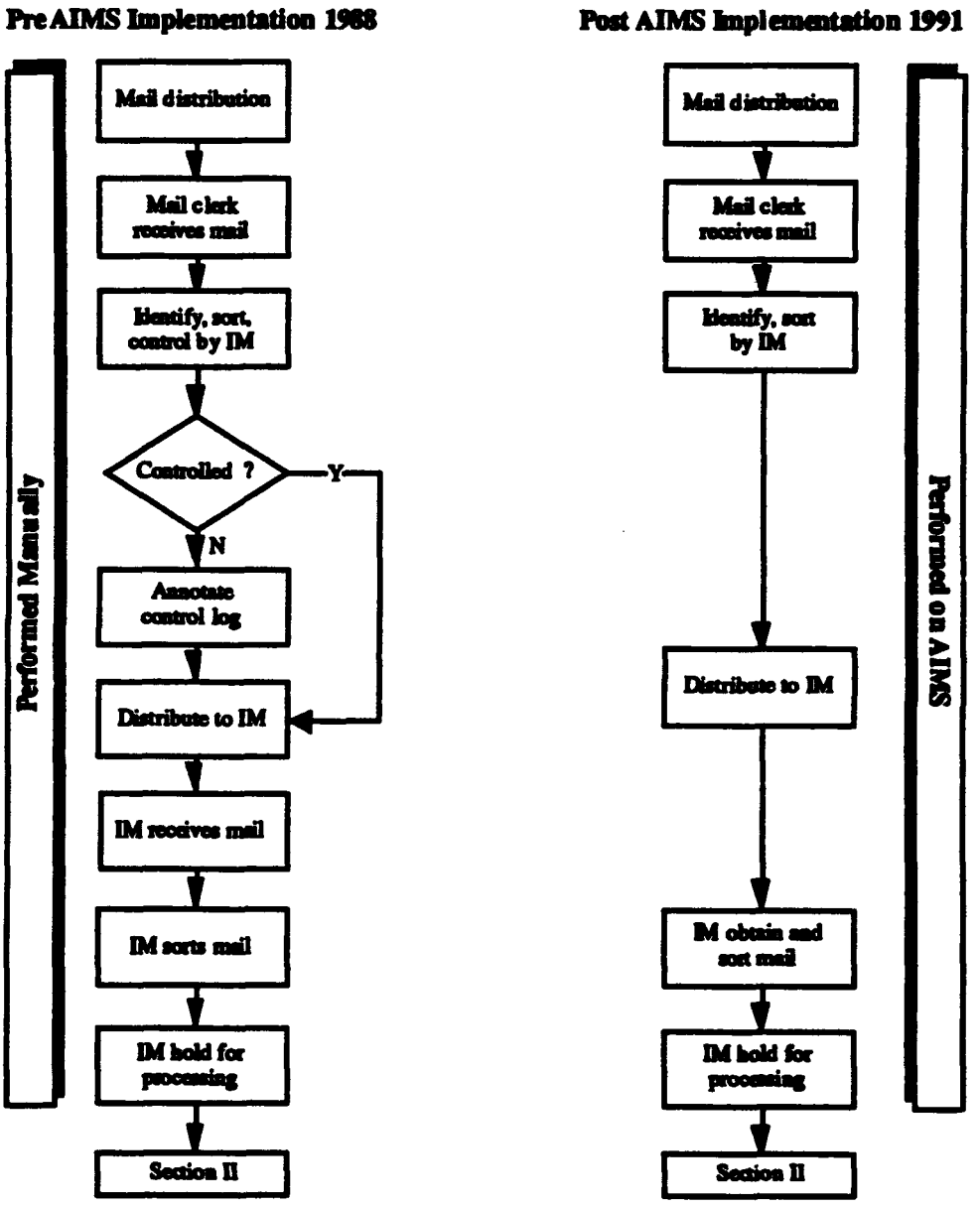
Prior to the implementation of AIMS, IMs would either analyze and process DLA Form 710 (low value procurement listing) or DLA Form 690 (SSCS). Processing these forms involved manual calculations to verify and analyze data on the SSCS. Summary-level information was provided on the SSCS; however, occasionally, further research on the part of the IM would be required to add needed detail or background information to the analysis.

AIMS eliminates all manual calculations. Calculations are now performed automatically through the system. The IM can run numerous scenarios of buy situations, varying quantities, expected lead time, delivery sites, etc., to determine the best recommendation to make. AIMS automatically calculates the effects of these changes and presents the changes as highlighted fields on the IM's computer monitor. The capability to run numerous simulations improves the IM's ability to make a sound decision and eliminates mathematical errors.

Detailed information that once involved extensive research, including back order, depot, and historical demand data, is contained on the AIMS data base. The IM must review numerous screens to compile the information, but extensive research at remote sources is no longer necessary.

A number of subelements within this element have been eliminated as a result of AIMS implementation. These are identified and quantified later in this section.

Exhibit 5-4
Section I - Workload Sorting/Distribution



Section III. Section III includes review and/or approval, follow-up actions to buys, processing MIPRs, and manual PRs/walk-throughs. Since the pre- and post-AIMS times for MIPR processing and manual PRs/walk-throughs are virtually unchanged and constitute a very small portion of the overall workload, these elements will not be addressed.

Each IM has a limitation on the maximum dollar value that he/she may approve for any given RB. Various levels of supervisors also have maximum levels; therefore, some RBs may go as far as the directorate level for approval. Prior to AIMS, the approval process involved hand-carrying documents between each level. If clarifications and/or explanations were required, the approval process was stalled until the two parties could meet to discuss the issue.

With AIMS implementation, the approval process is accomplished electronically and is facilitated by the use of an electronic notebook attached to the RB when it is sent to the supervisor for approval. The notebook contains a summary of all modifications made to the RB as well as any comments that the IM might want to add to assist with the approval process. The data in the notebook are permanently retained with the RB history. In addition, a temporary version of the notebook can be attached, which can be used to remind the supervisor of a particular issue, to send a question to the IM, or for other types of communications. As this is a temporary file, it is not part of the permanent RB history. AIMS contains all approval authority thresholds for each of the supervisors; therefore, it knows what level the RB must be sent to for approval.

The IM no longer has to search for the supervisor to obtain authorization; this function is handled electronically through AIMS with the aid of the notebook. The IM and the supervisor can pass notes electronically to inquire about a change. The notebook eliminates the need to annotate the SSCS, as any notations can be typed onto the screen in the provided notebook. As a result of these improvements, several subelements of Section III of the standard have been eliminated. The reduction in RB approval time has been verified through user interviews, and is quantified later in this section.

Section IV. Section IV includes processing cancellations, modifications, terminations, other related supply actions, and filing. Since these functions often occur after the purchase request has been forwarded to contracting, this includes retrieving the purchase request from contracting to make the changes and pulling the RB from records storage.

Prior to AIMS implementation, any errors were returned to the original IM. The IM or clerk would research the reasons for the error and make the necessary correction. At times this would require manually searching through SSCSs to find the original card, or obtaining the RB from records storage to determine the error. If there were to be any changes to the already produced purchase request, the IM would have to telephone the buyer, and manually annotate the original purchase request to reflect the changes.

Upon AIMS implementation, the IM has only to request a history of the RB to perform any changes or research any errors. The IM can tell what stage the purchase request is in, if changes can be made to the purchase request, and which buyer is processing the purchase request. The IM can contact the buyer, inform the buyer of any changes to be made, and then electronically input the changes. In supply centers where the IM is not connected to DLA Pre-Award Contracting System (DPACS), the IM must manually fill out Form 1128 (procurement subsystem amendment data transcript sheet) in order to make changes to an existing purchase request. However, several subelements of Section IV have been eliminated as a result of AIMS, and this impact is quantified later in this section.

Section V. Section V activities are primarily clerical in nature. In general, these activities involve sorting, forwarding, and distributing mail to the IM and filing the RBs. The workload associated with these tasks was reduced significantly upon AIMS implementation.

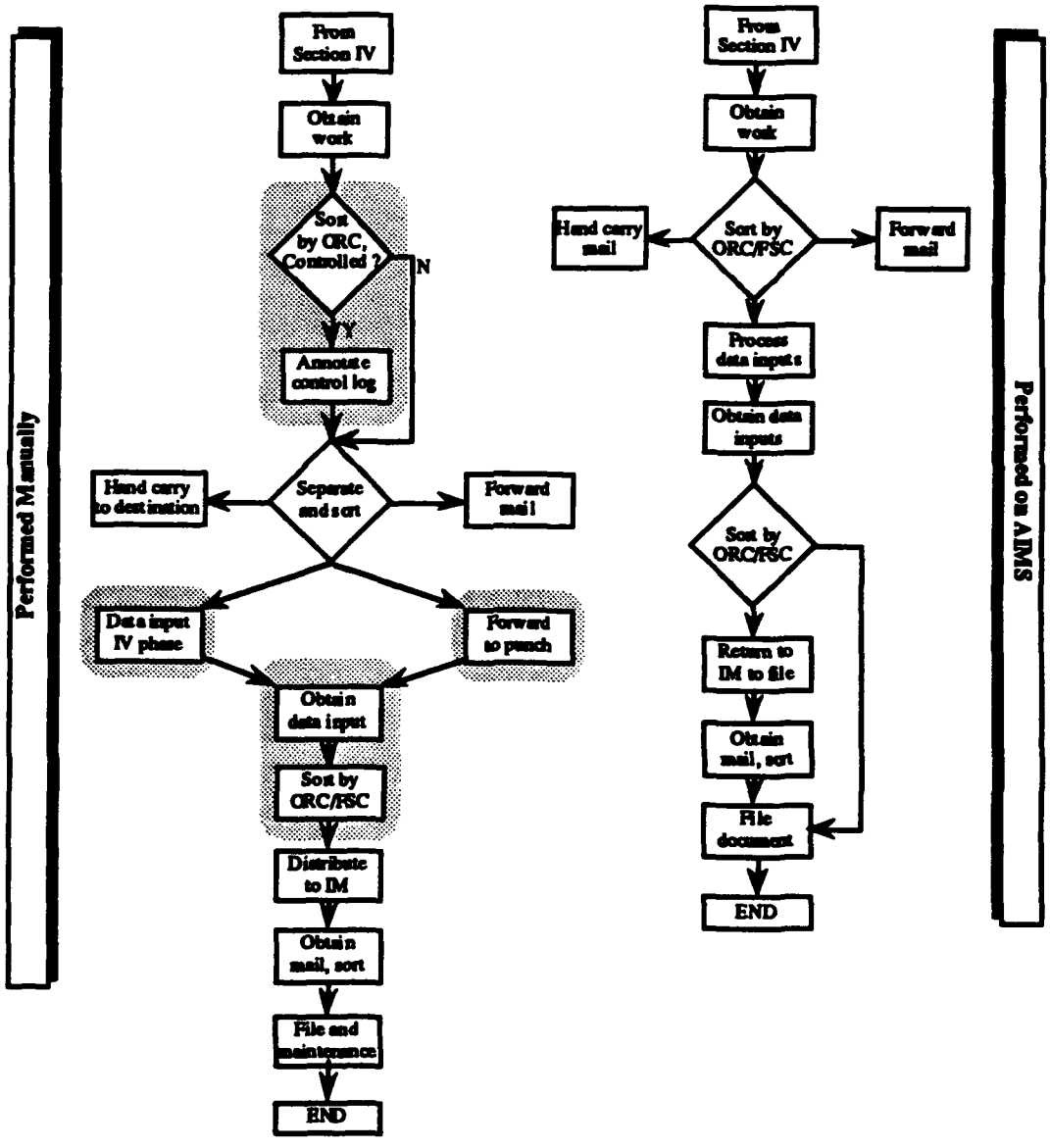
Prior to the implementation of AIMS, supply clerks sorted, forwarded, and distributed mail to the IM and filed RBs. The clerks sorted documents according to output routing code, and if necessary, annotated a control log. The clerk also separated, sorted, forwarded, and processed mail and data inputs. In addition, they distributed mail to the IM, obtained mail from the in-basket, and sorted and filed RBs. Based on the DPSSO standard at the time, a clerk spent 91.2 minutes performing these tasks for every 100 RBs.

With AIMS implementation, there were still two elements to this standard (clerical and IM). While the functions are similar to those above, some are performed electronically on AIMS. Processing data inputs via remote and sorting by ORC are two examples of once manual

functions that are currently performed by the system. As a result, the time required to accomplish the same task was estimated by DPSSO to be 39.0 minutes per 100 RBs.

AIMS has allowed the clerk to reduce the time spent processing data inputs and sorting by output routing code. Although clerks are still a necessary part of this process, the time spent on this process has been reduced by 52.2 minutes per 100 RBs. Exhibit 5-5 illustrates the change in functionality of sorting and filing resulting from AIMS implementation.

Exhibit 5-5
Section V - Sorting and Filing



Interviews

Interviews were conducted with current and former IMs at DISC and DGSC. These interviews focused on the functions performed by IMs to process RBs either with or without AIMS and the benefits associated with AIMS. The IMs description of processes has been incorporated into the

narrative of AIMS processes earlier in the text. The benefits identified by interviews fell into three categories: error reduction, electronic interface, and improved quality.

When citing error reduction, the elimination of manual mathematical computations was the first area mentioned. With AIMS, all mathematical calculations are performed on the system. For example, the IM can revise a buy quantity, which automatically updates other fields to reflect this change (such as, when a quantity is changed, the total amount automatically changes). Another type of error that has been virtually eliminated relates to repetitive data entry. Prior to AIMS, buyers would handwrite adjustments to RBs and give the adjustments to clerks to be re-input to the SAMMS system. Because the IM can make the adjustment in AIMS, the clerks no longer re-input data.

AIMS allows the IMs to process RBs without paper forms, and provides all the data formerly contained on an SSCS on the IM's workstation. This eliminates the time necessary for a clerk to distribute and sort SSCSs to the IM. Once the IM completes a buy decision, the buy is electronically sent to supervisors for review. This was cited by system users as a benefit because the IMs felt that the supervisors were able to more quickly turn around buys, as all elements of the SSCS are provided to the supervisor as soon as the IM approves the buy. Furthermore, through the use of the electronic notebook, supervisors and IMs are able to document questions and answers to RBs without wasting time trying to schedule a meeting.

Lastly, the IMs felt that they had information in AIMS that better guided them in buying the right quantity at the right time, thus making a more informed, quality buy. For example, if the IM's screen shows a dues-in amount, which figures into the RB quantity, the IM can go to a different screen and see where the dues-in is coming from and going to. In one observation, this was key because the dues-in quantity was coming from a contract that was four years old and would probably never arrive. The IM was able to determine that there was a contractual problem and thus zero out the dues-in amount and adjust the buy quantity. Without this feature, the IM would have underbought and a back order situation might have developed.

Management data

Management data were provided by DISC, DGSC, DPSSO, and DLA HQ. Management data were requested to validate information received through interviews and reviews of standards. Two of the main focuses of management data were personnel and lead time data for periods before and after AIMS implementation. The management data provided have been incorporated into the following subsection of the report.

Benefits quantification

As a global data point of reference for the observed impacts of AIMS, the number of IMs at DISC has decreased from 226 in 1988 to 202 in 1992. During the same period, the number of supply clerks has decreased from 36 to 25. The reasons for these changes are numerous – budget fluctuations, reorganizations, changes in acquisition policy (competition in contracting), and contract vehicles (delivery order contracts). Embedded in this reduction, however, is a transition to the use of automated tools such as AIMS. The following paragraphs synthesize the standard, interview, and performance data the study team analyzed, and estimate quantified savings attributable to AIMS. These benefits are grouped into the following areas: on-line processing of data; workload sorting, distributing, and prioritizing; current data; electronic interface; and lead time. Exhibit 5-6 summarizes the benefits.

Exhibit 5-6
Cash Savings - Standard Reductions

Function	FTEs Saved	Annual Cash Savings ($ million)
Electronic Interface	9.00	$0.402
Current Data	42.00	1.877
On-line Processing	36.00	1.619
Sort/Distribute/Prioritize	8.00	0.202
Total	95.00	$4.100

On-line processing of data

Based on statistics provided by DISC, 80 percent of the SAMMS-generated buys were revised before being approved. If the buy was revised by the IM, the IM completed a form or input card, which was then passed to a clerk who input the corrected data into a IV Phase terminal. The balance of system-generated buys was directly input into SAMMS by clerks. Edit/validation errors or violations could be caused by a missing piece of data on an input, an incorrect NSN, lack of compatibility between fields of data, incorrect sequence of inputs, etc. The IM would then be required to review the reason code, determine the action to be taken, annotate the corrections on the output or fill out a new input document, and forward the information to data entry for document preparation and reinput.

During each step of this process, error/violation notices are subject to loss, misrouting, and incorrect reentry. The IM responsible for the NSN determined the cause of the error, and obtained the necessary information to correct the error either through inquiries into SAMMS, the requester, or various other technical or management actions. In some cases the real reason for the error may not be the one indicated by the reason code, thus requiring extensive research.

Although the process appears simple, the correction may take multiple actions by the original submitter to get the information or approval to correct the error. The error notices can get lost or misplaced; however, the errors are controlled and the IM is provided with a daily listing of the edit/validation errors or violations to assure that all are reinput. Errors can also occur during the re-entry phase. If so, the item will reject again and the process starts over. If the correction is made and re-entry occurs, SAMMS will continue to process the item.

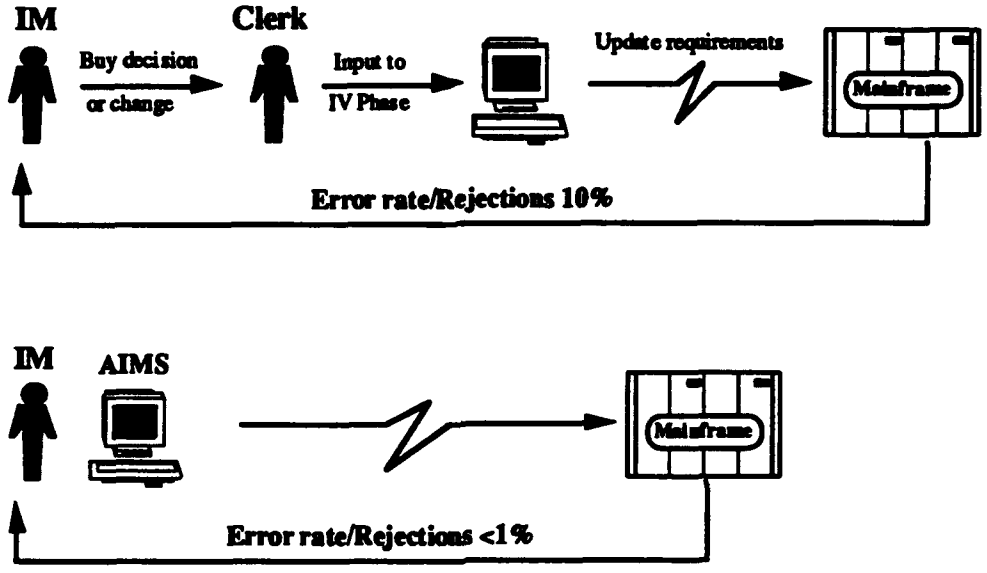
A March 1987, DISC study estimated a 10 percent error rate associated with this process which added 3.3 days to the equivalent supply administrative lead time.

With AIMS implementation, the clerical requirement for inputting to SAMMS has been eliminated entirely, and the RB violation rate has decreased to an immaterial level. When an IM decides to change an RB, the IM makes the change in AIMS. Once the change is approved by the appropriate authority, the buy is transmitted electronically to SAMMS when the next requirements cycle is run. Furthermore, AIMS provides the IM with on-line validation. For example, if the IM is determining how to allocate an RB quantity of 100 items between two depots, and inputs 50 items for Cherry Point and 75 items for Sharpe, AIMS will notify the IM that the buy quantity does not match the depot delivery quantity. The change in these processes is illustrated in Exhibit 5-7.

Based on conversations with several IMs and supervisors, current RB errors are less than 1 percent of the RBs approved; therefore, 9 percent of total approved buys do not require research. Based on a total number of RBs (997,551 in fiscal year 1992), approximately 89,780 (997,551 *

.09) errors/violations were avoided. Based on management estimates, it was assumed that the average time to research an error was five minutes. This is supported by the supply standard for errors (Standard Number 2105), which allows .1719 hours per error. By multiplying five minutes times the number of errors that have been eliminated, it was estimated that 7,480 hours (89,780 * 5 / 60) have been saved DLA-wide, this translates to approximately 4 FTE (7,480 / 2,007 * 1.18).

Exhibit 5-7
Processing of Data



In order to quantify the IM time saved because changes can be performed on AIMS, Standard 2310 was analyzed. Exhibit 5-8 illustrates the elements of the standard that have been eliminated as a result of the on-line processing function of AIMS. This exhibit illustrates the fact that .0557 hours, or about 3.3 minutes per RB, have been eliminated.

Exhibit 5-8
On-Line Processing Standard Elements Eliminated

Element	Title	Base	Frequency	Normal
D6	Prepare data change	0.0196	0.3500	0.0069
D9	Recompute buy amount	0.0347	0.6000	0.0208
G5	Modify buy - one location	0.0160	0.0990	0.0016
G6	Modify buy - multiple locations	0.0189	0.5590	0.0106
J9	Obtain/review delinquent RB report	0.0058	0.7250	0.0042
J12	Prepare code sheet for lost cards	0.0277	0.0150	0.0004
J14	Review report, determine violation cause	0.0084	0.1550	0.0013
J16	Prepare corrected buy card	0.0204	0.1550	0.0032
L12	Prepare header data change	0.0186	0.0600	0.0011
		0.1701		0.0500
			Performance, Fatigue, and Delay	11.4%
			Total time	0.0557

In order to estimate the impact of this change at each center, the annual workload, as shown in the Analysis and Methodology section of this report, was multiplied by the reduction of .0557 hours per RB generated by elimination of various elements to arrive at hours saved. The hours saved were increased by a leave factor of 18 percent and divided by 2,007 hours a year to arrive

at the number of FTEs saved. This equates to approximately 32 FTEs DLA-wide, as shown in site specific analysis in Exhibit 5-9. As a result, in total, approximately 36 FTEs (4 owing to a reduction in error/violation notices and 32 owing to a reduction in the on-line processing standard elements) are saved in this step.

Exhibit 5-9
On-Line Processing - FTE Saved

	Workload	Hours	FTE
DISC	272,162	15,162	8.91
DESC	241,600	13,460	7.91
DGSC	144,345	8,042	4.73
DCSC	165,354	9,212	5.42
DPSC(Med)	46,341	2,582	1.52
DPSC(C&T)	127,749	7,117	4.18
Total	997,551	55,574	32.00

Workload sorting, distributing, and prioritizing

Prior to AIMS, the clerks manually sorted through the RBs and distributed them to the appropriate IM. When the IM received the stack of RBs, they would prioritize them. This would include pulling out the low value procurement form, which the IM need only view, and filing it. The IM would then prioritize the remaining RBs and begin processing.

Personnel and lead time savings associated with workload distribution and prioritization of RBs have been realized as a result of AIMS implementation. Because the RB is electronically transferred from SAMMS to the appropriate IM through AIMS, clerk time is no longer spent sorting through RBs and distributing them to the appropriate IM; and the IM does not spend time sorting and prioritizing the RBs.

All IMs are assigned items by NSN, grouped by Federal supply class. AIMS then distributes the RBs by the NSN to the appropriate IM. Once transferred to AIMS, the RB sits in the IM's queue until the IM takes action. Each center establishes the specific criteria it uses for prioritization. Some of the options include RB age, dollar value of the buy, unit price, and back orders on hand for the item. This allows the centers to first work the buys they decide have the greatest priority.

The savings associated with automated sorting, distributing, and prioritizing are primarily clerical in nature. By combining Sections I and V of our analysis of standards, it was estimated that the time required to perform these functions has dropped by .0136 hours, from .0205 to .0069 hours, per RB. Based on a DISC workload of 272,162 RBs in fiscal year 1992, this translates to approximately 2 FTEs when adjusted for the leave component, 18 percent. Exhibit 5-10 illustrates the FTE savings by site and for DLA as a whole.

Exhibit 5-10
Benefits of Workload Sorting, Distributing, and Prioritizing - FTE Saved

	Workload	Hours	FTE
DISC	272,162	4,123	2.42
DESC	241,600	3,660	2.15
DGSC	144,345	2,187	1.29
DCSC	165,354	2,505	1.47
DPSC(Med)	46,341	702	0.41
DPSC(C&T)	127,749	1,935	1.14
Total	997,551	15,113	8.00

Providing current data

Current data allow the IM to make better informed and more timely buy decisions. Prior to AIMS, the stock-on-hand situation might have changed between the time the item reached the reorder point and the time the IM actually worked the study. Stock transfers, customer returns, or recent increased demand could result in underbuys or overbuys.

The elements of Standard 2310 were analyzed to determine which actions associated with obtaining current data, or "refreshment," have been eliminated as a result of AIMS implementation. Exhibit 5-11 illustrates the elements that are no longer performed by the IMs because AIMS automatically receives current data from SAMMS each requirement cycle. As shown in the exhibit, .0720 hours have been saved per RB as a result of AIMS implementation.

Exhibit 5-11
Current Data Standard Elements Eliminated

Element	Title	Base	Frequency	Normal
J4	Obtain/Review Remote	0.0248	0.0830	0.0021
K2	Obtain/Review Remote	0.0257	1.0000	0.0257
L4	Obtain/Review Remote	0.0248	0.8850	0.0219
M4	Obtain/Review Remote	0.0248	0.4220	0.0105
E10	Obtain/Review Remote	0.0149	0.3000	0.0045
		0.1150		0.0646
			Performance, Fatigue, and Delay	11.4%
			Total time	0.0720

In order to estimate the impact of this change at each center, the annual workload, as shown in the analysis and methodology section of this report, was multiplied by the reduction of .0720 hours to arrive at hours saved. The hours saved were increased by a leave factor of 18 percent and divided by 2,007 hours per year to arrive at FTEs saved. The estimate of FTEs saved DLA-wide is approximately 42, as shown in Exhibit 5-12.

Exhibit 5-12
Current Data - FTEs Saved

	Workload	Hours	FTE
DISC	272,162	19,599	11.52
DESC	241,600	17,398	10.23
DGSC	144,345	10,394	6.11
DCSC	165,354	11,907	7.00
DPSC(Med)	46,341	3,337	1.96
DPSC(C&T)	127,749	9,199	5.41
Total	997,551	71,835	42.00

Electronic interface

Prior to AIMS, RBs were physically carried between IMs and various levels of supervision to obtain necessary approvals. Due to various levels of approval authority, the IM spent a significant amount of time going to each level of supervision. After approval, RBs would be input to a IV Phase computer by a clerk, and were passed to procurement when the next requirements cycle was run. RBs are currently electronically transferred between the IM and supervisor through AIMS.

With AIMS, supervisors can also communicate with the IMs through an electronic notebook located in each RB. One type of notebook is temporary and allows the IM and supervisor to communicate questions or special items of interest. This notebook is deleted when the RB is approved and sent to SAMMS. A permanent notebook is used for logging in any changes made to the RB and to document any unusual information regarding the RB.

Through the use of temporary notebooks and electronic interfaces between the IM and supervisors, IMs spend less time obtaining approval of buys. Furthermore, changes to buys are easily documented for future questions and research. In order to quantify this benefit, two sources of information were tapped: the proportion of buys requiring approval, and the length of time required for approval.

Based on element I of the 1988 version of Standard 2310, and element J of the 1991 version, 13.3 and 15.0 percent of the buys required approval respectively. Discussions with IMs and supervisors, confirmed the reasonableness of this estimate. Exhibit 5-13, illustrates the steps that are no longer required because of AIMS implementation. In summary, .0167 hours are no longer required by the IM per RB to obtain supervisor approval. Supervisors are still required to approve the buys, and, based on interviews, the time required by the supervisor has not changed significantly.

Exhibit 5-13
Electronic Interface Standard Elements Eliminated

Element	Title	Base	Frequency	Normal
J4	Determine Review Level	0.0025	1.0000	0.0025
L4	Forward to Supervisor	0.0060	1.0000	0.0060
M4	Furnish Additional Data	0.1050	0.0420	0.0044
E10	Furnish Additional Data	0.1096	0.0190	0.0021
		0.2231		0.0150
	Performance, Fatigue, and Delay			11.4%
			Total time	0.0167

In order to estimate the impact of this change at each center, the annual workload, as shown in the analysis and methodology section of this report, was multiplied by the reduction of .0167 hours to arrive at hours saved. The hours saved were increased by a leave factor of 18 percent and divided by 2,007 hours per year to arrive at FTEs saved. This equates to approximately 9 FTEs saved DLA-wide, as shown in Exhibit 5-14.

Exhibit 5-14
Electronic Interface - FTE Saved

	Workload	Hours	FTE
DISC	272,162	4,546	2.67
DESC	241,600	4,035	2.37
DGSC	144,345	2,411	1.42
DCSC	165,354	2,762	1.62
DPSC(Med)	46,341	774	0.46
DPSC(C&T)	127,749	2,134	1.25
Total	997,551	16,661	9.00

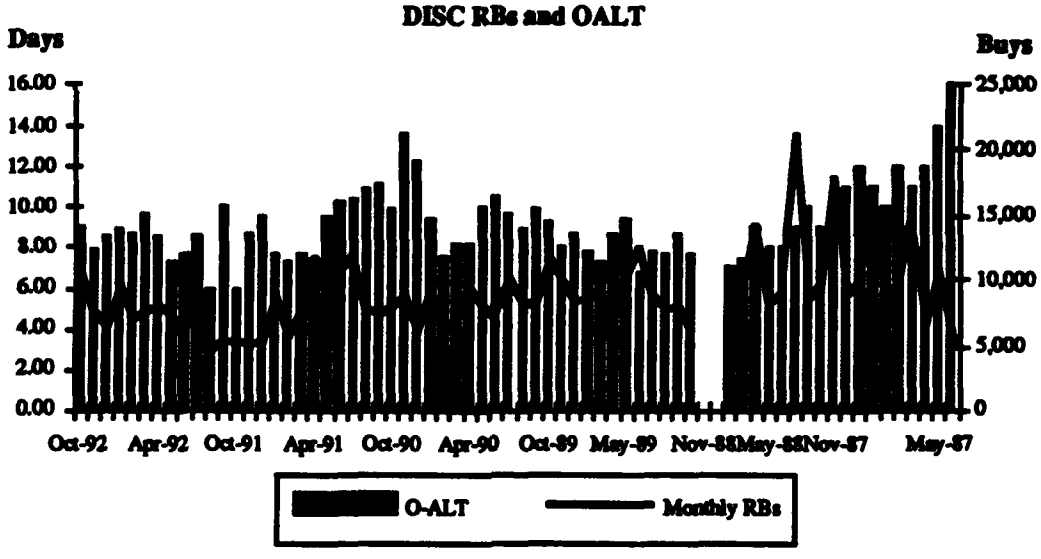
Lead time

The reduction of supply lead time was cited as a significant benefit of AIMS implementation in previous economic analyses. The first analysis, AIMS Benefits to DISC, December 1, 1988, quantified lead time savings of approximately 2.8 days of OALT reduction associated with the following areas:

■ distribution and data input	8.00 hours
■ sorting	0.25 hours
■ refreshment	2.00 hours
■ process error transactions	12.00 hours
	22.25 hours

Other analyses identified in this report cited similar savings. However, none of the savings documented how the lead time would actually be reduced. In an effort to validate lead time savings, the study team analyzed DISC supply administrative lead time statistics from 1988 through 1992. Exhibit 5-15 illustrates DISC's lead time statistics for the period studied.

Exhibit 5-15
DISC OALT and RB Volume



As shown above, no discernible trend is evident from the DISC statistics. The study team was informed, however, that the method for calculating lead time changed at some point after AIMS implementation. Prior to AIMS, all recommended buy data were included in the statistics, including the large quantities of low value procurements (<$2,500) that did not go through IMs. These procurements typically had very short lead times. Since AIMS introduction, only those buys processed by AIMS are included in lead time count at DISC. As a result, low value procurements and their short lead times are no longer counted. Since a pure comparison of data shows relatively no change in lead time, adjusting for this bias would actually show a decrease as a result of AIMS were the data available to perform such an analysis.

As discussed earlier, DISC performed an analysis in March 1987, that determined that 10 percent of the approved buys were significantly delayed because of input errors and violations caused by

duplicated data entry. The delay was estimated to be 3.3 days of additional ALT because the buys were stalled by the processes of identifying errors, making the appropriate corrections and reinputting data. Because AIMS has reduced the error/validation rate from 10 percent to less than 1 percent, elimination of this delay results in a 2.97 day decrease.

Summary

For the purposes of this analysis, personnel and lead time savings are assumed to begin in fiscal year 1992 since incremental system operation began in fiscal year 1990. Exhibit 5-16 below summarizes the costs and benefits accrued through fiscal year 1992. Costs are presented in then year dollars and are converted to fiscal year 1993 dollars to enable comparison to benefits which are also in fiscal year 1993 dollars.

Exhibit 5-16
Costs and Benefits Through Fiscal Year 1992 ($ million)

	FY 87	FY 88	FY 89	FY 90	FY 91	FY 92	Total
Costs							
Investment	$0.43	$5.10	$3.70	$2.93	$0.80	$1.73	$14.69
Recurring costs	0.01	0.15	0.48	0.93	1.07	1.05	3.68
Total Costs	$0.43	$5.25	$4.19	$3.85	$1.87	$2.78	$18.37
Costs (FY 93$$)	$0.54	$6.26	$4.80	$4.29	$1.98	$2.88	$20.76
Savings (FY 93$$)							
Personnel						$4.10	$4.10
Lead time (one-time)						0.68	0.68
Lead Time (Recurring)						0.05	0.05
Total Savings						$4.83	$4.83

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FUTURE COSTS AND BENEFITS

Future functionality

The AIMS system was designed, implemented, and accepted by all DLA sites as of fiscal year 1991. The system that was accepted by DLA met the original requirements for a DLA system. AIMS has been selected as a migration system and will eventually become part of a DoD materiel management system. Additionally, the JLSC is in the process of identifying the user requirements for a DoD standard materiel management system. Once user requirements are identified, additional hardware investment will be made on the part of the JLSC to devise the DoD system.

At the current time, AIMS is being ported from Unify to Oracle. This effort requires significant data mapping and is being funded by the JLSC. However, this effort will not change the existing functionality of the system (e.g. this will not provide the user with new capabilities). This effort will simply move the database from one operating environment to another. As discussed later in this section, the move from Unify to Oracle would occur with or without the presence of the JLSC, due to DLA's current hardware replacement plans. Once the system is ported to Oracle, the JLSC is expected to begin new development towards a DoD system. However, this analysis does not include any costs or benefits of adding additional functionality to the existing AIMS system (e.g. movement towards a DoD system). Appendix H of this report contains a narrative of some of the future considerations for a DoD system.

Future costs

Additional costs attributable to AIMS over the period of this analysis primarily include estimated hardware replacement and maintenance costs. In association with the hardware replacement effort, costs are included for the transition (porting) from Unify to Oracle.

Investment

Hardware. It was confirmed by DLA personnel that all hardware investments for initial AIMS implementation have been made prior to fiscal year 1993. As a result, at the current time, the only future hardware investments expected to be required are for hardware replacement. Using DLA's current policy of replacing workstations and printers on five year intervals and DMINS on eight year cycles, total estimated costs for hardware replacement through the period of this analysis, fiscal year 2001, were estimated to be $7.05 million. Workstation and printer costs were estimated using current costs from the Army Small Multi-user Computer contract, while DMINS replacement costs were based on discussions with DLA-Z.

A contract for mid-tier Hewlett-Packard computers (with Oracle software) was recently awarded. As discussed in the Analysis and Methodology section of this report, it has been assumed that HP 9000/877 minicomputers, running Oracle's V7 RDBMS, will replace the existing Gould minicomputers. Cost estimates for midtier replacement were developed based on the configuration presented in Exhibit 6-1, as priced in the Navy minicomputer contract. A ten percent additional cost was added to identified costs to account for cabling and other site unique miscellaneous items. These configurations represent replacements (or technical upgrades), not enhancements.

Exhibit 6-1
Midtier Replacement Configuration

Hewlett Packard 9000/877 Business Server	$168,345
Hewlett Packard PA-RISC 64 MHz Processor	
Numeric Co-Processor	
8.0 Gigabyte DAT	
IEEE 802.3 LAN Interface	
384 Megabyte Random Access Memory	
6.71 Gigabyte Hard Disk	
10 - 690 meter DDS cassettes for DAT drive	
2 Cabinets/Racks	
Surge Supressor	
SCSI Terminal Server	
Four - HP 9000 Model 730 Servers	
Hewlett Packard PA-RISC 66 MHz Processor	
Integral 66 MHz Floating Point Co-Processor	
128 Megabytes Random Access Memory	
840 Megabyte SCSI II Hard Disk	
3 - 5 KVA Uninterrupted Power Supply with cables	22,820
20.325 Gigabyte Chassis Mounted Hard Disk	41,786
10.84 Gigabyte Rack Mounted Hard Disk	22,286
Additional 7 Address SCSI controller	3,411
Expansion Cabinet	926
Acoustical Suppression for Cabinet	188
Subtotal	259,762
Plus Misc. Cables, Site Specific Requirements	26,000
Total Cost	$ 285,762

As a result of the assumption that the Gould minicomputers will be replaced with HP 9000/877 minicomputers, running Oracle's V7 RDBMS, a cost estimate is necessary for porting the AIMS database from Unify to Oracle. In general, the effort required to port AIMS from Unify to Oracle will depend on several criteria. First, the size of the files and the number of screens and reports must be considered. Next, the level of documentation, for the database and "C" programs must be evaluated. As a result, data mapping must be conducted.

DLA has recently performed estimates of the required effort to map data and move from Unify to Oracle, without adding functionality. DLA currently estimates that this effort will require 42,881 hours of labor and expects that 30,820 hours will be incurred by DSAC and 12,061 will be incurred by FMSO (a Navy CDA). Using a leave factor of 18% and assuming there are 2007 hours in a work year, this translates into 25.2 work years of effort. Assuming the annual cost of FMSO labor approximates DSAC, the total cost of this effort was estimated at $1.7 million in fiscal year 1993 dollars using the previously cited DSAC burdened rate of $67,870. In addition, travel costs of $140,000 and training costs of $87,000 (both in fiscal year 1993 dollars) have been estimated.

Workstation and printer replacement costs were estimated using current costs from the U.S. Army Small Multiuser Computer contract. The workstation configuration in Exhibit 6-2 was used as the standard replacement for AIMS workstations. Replacement costs for the network NIPs were estimated using GSA schedule rates from various vendors for true network printers since no current DLA contract vehicle could be identified. Exhibit 6-2 also identifies NIPS configurations.

Exhibit 6-2
Replacement Workstation Configuration

Intel 80486DX 33 MHz Processor	
8 Megabyte Random Access Memory	
213 Megabyte Hard Disk	
5.25" 1.2 Megabyte Floppy Disk Drive	
3.5" 1.44 Megabyte Floppy Disk Drive	
Super VGA Monitor	
Graphics Accelerator Super VGA Card	
MS DOS 5.0	
Subtotal	$2,221
Windows 3.1 with Mouse	$81
Total Cost	$2,302

Replacement NIPS Configuration

Local Area Network NIP	
QMS PS-2000 Departmental Printer	
20 pages per minute	
with Ethernet network card	
Total Cost	$12,636

Software. As a result of acquiring replacement hardware through the Navy minicomputer contract, Oracle's V7 software will also be acquired. Based on current contract rates, Oracle's runtime version was estimated at $45,159 (fiscal year 1993 dollars) per machine (one-time).

Recurring costs

As AIMS continues operating, the major costs to the system will be hardware and software maintenance costs.

Software maintenance. Software maintenance costs were estimated based on discussions with DSAC Columbus personnel. The level of effort identified in the previous section, one FTE annually was established beginning in fiscal year 1991 and is expected to continue through the end of the period of analysis. The new database software will also require annual maintenance of $1,222 after a one year warranty period, for Oracle RDBMS technical support and service. Over the period of the analysis, government and commercial software maintenance will total $0.61 million.

Hardware maintenance. The methodology used to determine actual maintenance costs was carried forward to future time periods. Some modifications were made, however, to account for changing realities in DLA hardware procurements. Specifically, based on the Navy minicomputer contract, the assumption was made that new minicomputers would come with a one year warranty and annual maintenance expense thereafter of $9,228. The current maintenance expense on the Gould minicomputers, $120,000 per year, is significantly higher than this because the models DLA operates today are no longer in production and are near the end of their useful life.

Under the Army Small Multi-user Computer and Desktop III contracts, workstations and NIPS carry a two year warranty that eliminates all maintenance costs. This was factored into the

analysis, although workstations procured under the prior contract do not receive this warranty benefit, and must bear an estimated maintenance fee immediately. Using these assumptions, over the period of this analysis, total hardware maintenance costs are estimated to be $5.68 million, bringing the total remaining investment, operations and maintenance costs for AIMS to $15.52 million. A summary of these costs can be found in Exhibit 6-3, below, with details provided in Appendix G.

Exhibit 6-3
Total Remaining Costs FY 93-FY 01 (FY 93 $000)

	FY93	FY94	FY95	FY96	FY97	FY98	FY99	FY00	FY01	Total
Investment										
Hardware	$0	$2,475	$0	$286	$668	$1,143	$2,475	$0	$0	$7,046
Software	1,711	0	0	45	0	181	0	0	0	1,937
Other - Training, Travel	227	0	0	0	0	0	0	0	0	227
Total Investment	$1,938	$2,475	$0	$331	$668	$1,324	$2,475	$0	$0	$9,210
Recurring Costs										
Software Maintenance	$68	$68	$68	$68	$69	$69	$74	$74	$74	$632
Hardware Maintenance	980	839	847	850	837	357	278	285	409	5,682
Total Recurring	1,048	906	914	918	906	426	352	359	483	6,313
Total	$2,986	$3,381	$914	$1,249	$1,573	$1,749	$2,827	$359	$483	$15,523

Future benefits

Future personnel benefits are estimated by extending the benefits derived from the standards analysis described in the previous section to all the remaining centers. Extending these estimated benefits, in a steady state analysis, to all sites is estimated to provide annual savings of approximately 95 FTEs, for an annual cash savings of $4.1 million. A breakdown of these personnel savings by work area is provided below.

Exhibit 6-4
DLA Personnel Savings

Function	FTEs Saved	Annual Cash Savings ($ million)
Electronic Interface	9.00	$0.402
Current Data	42.00	1.877
On-line Processing	36.00	1.619
Sort/Distribute/Prioritize	8.00	0.202
Total	95.00	$4.100

The 2.97 day lead time savings identified in the previous section has substantial annual cost savings through the end of this analysis. Using the following pieces of information, the savings can be quantified:

- $1,143,714 per day (from DORO update)
- assume 41% will actually be saved to account for items which ultimately will not be replenished
- time phase savings - 20% in year 1, 15% in year 2, 6% in year 3

As stated in the previous section, in the first full year of system implementation, fiscal year 1992, estimated incurred savings were $0.68 million. In fiscal year 1993, the second year of non-recurring safety level reduction is estimated to be $0.51 million, and in fiscal year 1994 savings of $0.20 million are estimated.

Estimating for recurring inventory holding costs, using the assumption that 8 percent of the initial non-recurring reductions will be realized annually as a recurring cost reduction, as was explained in Section 5, yields annual savings of $0.11 million in fiscal year 1994 and beyond.

Total benefits of $38.60 million, fiscal year 1993 constant dollars, are expected for the remainder of the period of this analysis. Against estimated costs of $15.52 million the net savings from fiscal year 1993 to 2001 are estimated to be $23.08 million Exhibit 6-5 is a time phased summary of these future costs and benefits.

Exhibit 6-5
Future AIMS Costs and Benefits (FY 93 $ million)

	FY 93	FY 94	FY 95	FY 96	FY 97	FY 98	FY 99	FY 00	FY 01	Total
Costs										
Investment	$1.94	$2.47	$0.00	$0.33	$0.67	$1.32	$2.47	$0.00	$0.00	$9.21
Recurring costs	1.05	0.91	0.91	0.92	0.91	0.43	0.35	0.36	0.48	6.31
Total Costs	$2.99	$3.38	$0.91	$1.25	$1.57	$1.75	$2.83	$0.36	$0.48	$15.52
Costs (FY 93$$)	$2.99	$3.38	$0.91	$1.25	$1.57	$1.75	$2.83	$0.36	$0.48	$15.52
Savings (FY 93$$)										
Personnel	$4.10	$4.10	$4.10	$4.10	$4.10	$4.10	$4.10	$4.10	$4.10	$36.90
Lead time (one-time)	0.51	0.20								0.71
Lead Time (Recurring)	0.10	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.99
Total Savings	$4.70	$4.42	$4.21	$4.21	$4.21	$4.21	$4.21	$4.21	$4.21	$38.60
Net Savings/(cost)	$1.72	$1.03	$3.30	$2.96	$2.64	$2.46	$1.38	$3.85	$3.73	$23.08

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SUMMARY COMPARISON

As a result of recent information available to the study team from actual AIMS site implementation and operation, estimates of costs and benefits resulting from AIMS presented in this study have been reduced significantly from prior estimates. Implementation costs are all actual costs, since by the end of fiscal year 1991, all hardware implementation costs for the six ICPs have been incurred, and the system is operational. In fiscal year 1992, benefits began to accrue at all installation sites.

In this analysis, estimates of life cycle costs attributable to AIMS have been reduced by approximately 30 percent from original estimates of $49.8 million (including sunk costs) in the *I³ Cost/Benefits Analysis* to $36.3 million, when all costs are inflated to fiscal year 1993 dollars. The methodology of this study emphasized a total cost approach, and included sunk costs, which were generally for initial DMINS and workstation procurements as well as system hardware maintenance. However, sunk costs were excluded from all present value calculations. The largest cost reduction is attributable to the reduced charge for software maintenance resulting from the study team's methodology, which was based on DLA-Z level of effort estimates for the CIM Procurement council. This methodology differs from the initial Milestone I assumption that all DSAC staff would perform maintenance after system implementation, making our estimate of total system costs lower than original estimates.

This significant reduction in the estimated non-recurring and recurring costs of AIMS has been offset by a more than 40 percent reduction in the estimated cash savings resulting from AIMS functional benefits. The initial estimate of AIMS benefits in the *I³ Cost/Benefits Analysis* identified possible cash savings of nearly $77.0 million resulting from a personnel reduction of 165 FTE. This estimate continued to decrease over time to $37.0 million in the Milestone II revision and to approximately $28.4 million in the October 1991 analysis, which estimated personnel reductions of only 58.3 FTE. Our current estimate increases the estimated benefits to $38.6 million to account for an increased personnel reduction, to 95 FTE. The benefits in the current analysis are a result of the ability to perform detailed analysis in the change of the recommended buy performance standards measured by DPSSO that have resulted from AIMS implementation. The increased benefits estimate from personnel were partially offset by a decrease in the value of non-recurring and recurring savings from lead time reduction, but are still larger than the previous two estimates.

Exhibit 7-1 summarizes the historical estimates of AIMS cost and benefit streams studied by the team and elaborated on in Section 4, while Exhibit 7-2 is a compilation of the study team documentation of actual and projected figures, as detailed in Sections 5 and 6.

AIMS historical costs and benefits

Historical estimates of AIMS costs and benefits are shown in Exhibit 7-1. The following qualifiers apply to them:

- the incremental AIMS costs are documented in Section 4 and represents a summary of AIMS specific costs where identifiable in the DLA Milestone I study, and an allocation of the balance. This stream represents the total DLA cost to perform the recommended buy function with AIMS.
- all costs are converted to fiscal year 1993 dollars.
- each source of benefits is shown in fiscal year 1993 dollars. Net savings/(cost) are computed and discounted by year.
- sunk costs are not used in discounting calculations, differences in years excluded are a result of different report dates, hence sunk costs are for different time periods.

Exhibit 7-1
AIMS Historical Economics
($ million)

	FY 85-88	FY 89	FY 90	FY 91	FY 92	FY 93	FY 94	FY 95	FY 96	FY 97	FY 98	FY 99	FY 00	Total	Excluding 1985-88	Excluding 1985-90
Incremental AIMS Cost (FY 88 $)	$0.2	$9.4	$6.1	$1.1	$1.1	$1.2	$6.2	$1.5	$1.1	$2.8	$4.3	$5.8	$1.1	$41.8	$41.6	$26.1
FY 93 $$	$0.2	$11.3	$7.2	$1.3	$1.3	$1.4	$7.4	$1.8	$1.3	$3.4	$5.1	$6.9	$1.3	$49.8	$49.6	$31.1
Milestone I Savings (FY 93 $)																
Total Benefits				$13.6	$7.0	$7.0	$7.0	$7.0	$7.0	$7.0	$7.0	$7.0	$7.0	$77.0	$77.0	
Net Savings/(cost)	($0.2)	($11.3)	($7.2)	$12.3	$5.8	$5.6	($0.4)	$5.3	$5.8	$3.6	$2.0	$0.1	$5.8	$27.1	$27.3	
Discounted Savings/(cost)		($10.7)	($6.3)	$9.7	$4.1	$3.6	($0.2)	$2.8	$2.8	$1.6	$0.8	$0.1	$1.9		$10.3	
Sunk cost years 1985-1988																
Milestone II Savings (FY 93 $)																
Total Benefits				$8.4	$3.7	$3.1	$3.1	$3.1	$3.1	$3.1	$3.1	$3.1	$3.1	$37.0		$37.0
Net Savings/(cost)	($0.2)	($11.3)	($7.2)	$7.1	$2.4	$1.7	($4.3)	$1.3	$1.8	($0.3)	($2.0)	($3.8)	$1.8	($12.9)		$5.9
Discounted Savings/(cost)				$6.7	$2.1	$1.3	($3.1)	$0.9	$1.1	($0.1)	($1.0)	($1.7)	$0.7			$7.0
Sunk cost years 1985-1990																
Milestone II (Update) Savings (FY 93 $)																
Total Benefits				$3.2	$3.5	$3.0	$2.7	$2.7	$2.7	$2.7	$2.7	$2.7	$2.7	$21.7		$28.4
Net Savings/(cost)	($0.2)	($11.3)	($7.2)	$1.9	$2.2	$1.6	($4.7)	$0.9	$1.4	($0.7)	($2.4)	($4.2)	$1.4	($21.4)		($2.7)
Discounted Savings/(cost)				$1.8	$1.9	$1.2	($3.4)	$0.6	$0.8	($0.4)	($1.2)	($1.9)	$0.6			$0.11
Sunk cost years 1985-1990																

AIMS actual/future costs and benefits

The historical estimates summarized above correlate to the summary of actual and future costs presented in Exhibit 7-2, with the following qualifiers:

- total cost streams are from Sections 5 and 6 of our study.
- all costs are converted to fiscal year 1993 dollars.
- benefits are shown by category in fiscal year 1993 dollars, net savings/(cost) are computed and discounted by year.
- sunk costs are not used in discounting calculations, differences in years excluded are a result of different report dates, hence sunk costs are for different time periods.

Exhibit 7-2
AIMS Actual/Future Costs and Benefit ($ million)

	FY 87-91	FY 92	FY 93	FY 94	FY 95	FY 96	FY 97	FY 98	FY 99	FY 00	FY 01	TOTAL	Total w/o sunk
Costs													
Investment	$12.96	$1.73	$1.94	$2.47	$0.00	$0.33	$0.67	$1.32	$2.47	$0.00	$0.00	$23.90	$9.21
Recurring costs	2.63	1.05	1.05	0.91	0.91	0.92	0.91	0.43	0.35	0.36	0.48	9.99	6.31
Total Costs	$15.59	$2.78	$2.99	$3.38	$0.91	$1.25	$1.57	$1.75	$2.83	$0.36	$0.48	$33.89	$15.52
Costs (FY 93$$)	$17.88	$2.88	$2.99	$3.38	$0.91	$1.25	$1.57	$1.75	$2.83	$0.36	$0.48	$36.28	$15.52
Savings (FY 93$$)													
Personnel		$4.10	$4.10	$4.10	$4.10	$4.10	$4.10	$4.10	$4.10	$4.10	$4.10	$41.00	$36.90
Lead time (one-time)		0.68	0.51	0.20								1.39	0.71
Lead Time (Recurring)		0.05	0.10	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11	1.04	0.99
Total Savings		$4.83	$4.70	$4.42	$4.21	$4.21	$4.21	$4.21	$4.21	$4.21	$4.21	$43.44	$38.60
Net Savings/(cost)	($17.88)	$1.95	$1.72	$1.03	$3.30	$2.96	$2.64	$2.46	$1.38	$3.85	$3.73	$7.15	$23.08
Discounted Savings/(cost)	($17.88)	$1.95	$1.64	$0.90	$2.60	$2.12	$1.72	$1.46	$0.75	$1.89	$1.66	($1.20)	$14.73

AIMS economic comparison

The significant reduction in estimated cash savings, accompanied by the smaller reduction in total system costs, has degraded the expected financial performance of the system investment from the initial I^3 Milestone I analysis as estimated by several standard tools of financial analysis. Below is a comparison of key economic analysis statistics for each of the historical cost and benefit analyses, summarized in Exhibit 7-1, against our revised savings profile of actual and future estimated costs and benefits from Exhibit 7-2.

Exhibit 7-3
AIMS Economic Comparison ($ million)

	Milestone I	Milestone II	Milestone II Update	1993 Actual/Projected
Cost	$49.6	$31.1	$31.1	$15.5
Benefits	77.0	37.0	28.4	38.6
Savings	$27.3	$5.9	($2.7)	$23.1
Discounted Savings	$10.3	$7.0	$0.1	$14.7
Payback (years)	4.9	5.4	9.9	2.9
Savings/Investment Ratio	1.4	1.7	1.0	3.2
Base Year	1988	1990	1990	1993
Sunk Cost Years	FY 85-88	FY 85-90	FY 85-90	FY 87-92

The net present value (NPV) for the actual costs and benefits plus expected costs and benefits is shown with the summary of each set of data (total discounted savings). In accordance with DLAM 7041.1, this calculation uses a discount rate of 10 percent. The net present value represents the value of the sum of the cash flow in all years, discounted to some time. For the purpose of conducting this analysis, all costs and benefits from previous estimates have been inflated to constant fiscal year 1993 dollars and then discounted back to fiscal year 1988 for Milestone I and to fiscal year 1990 for Milestone II, for comparison with the original estimates.

The improvement in economic indicators is driven chiefly by our revised estimate of personnel savings. Current estimates based on DPSSO standards analysis indicates that DPACS will save approximately 95 FTE per year as compared to earlier analyses that did not have the benefit of actual AIMS operations and predicted a personnel reduction of 58.3 FTE per year. Changes in the estimated length of lead time saved, down to 2.4 days from 2.8 days in previous analyses, and the reduction in the cash savings per day of lead time saved offset some of the estimated increasing profitability from increased personnel reductions.

The Milestone I document estimated AIMS incremental cost at $49.6 million, fiscal year 1993 dollars, excluding sunk costs (fiscal years 1985-1988). At the same time, benefits were estimated at $77.0 million, fiscal year 1993 dollars, resulting in a net savings of $27.3 million, fiscal year 1993 dollars. When discounted to fiscal year 1988, the net present value was $10.3 million (fiscal year 1993 dollars). Furthermore, the Milestone I document estimated that the discounted payback would occur in 4.9 years (excluding sunk costs) and the savings investment ratio was 1.4.

The Milestone II document reduced total benefits by more than 50 percent to $37.0 million (fiscal year 1993 dollars), but did not address costs (we have extended the Milestone I estimate for illustrative purposes, but have expanded sunk costs to include fiscal years 1985-1990). The net discounted savings at this time equal $7.0 million, the savings to investment ratio rose to 1.7 and the discounted payback period increased to 5.4 years. It should be noted that the Milestone II analysis was only a benefits analysis. The results of the Milestone II analysis were never compared to existing cost estimates.

Typically, the internal rate of return is calculated to illustrate the relative profitability of a project. However, due to non normal cash flows (cash outflows in the outyears and cash inflows in the early years), multiple IRRs result for the Milestone II and Milestone II Update analyses. Therefore IRRs for the individual analyses are not presented

In the update to the Milestone II document, benefits were lowered by another 25 percent to $28.4 million (fiscal year 1993 dollars). Again, this analysis did not address costs, and again Milestone I costs (with fiscal year 1985-1990 as sunk costs) were used for illustrative purposes. When discounted to fiscal year 1990, the net present value is $0.1 million. The discounted payback period was extended to 9.9 years. The savings investment ratio for AIMS fell further, based on these benefits estimates, to 1.0. It should be noted that the Milestone II analysis was only a benefits analysis. The results of the Milestone II analysis were never compared to existing cost estimates.

The results of the current analysis fall somewhere between previous analyses. Actual and future costs are estimated to total $15.5 million (fiscal year 1993 dollars, excluding sunk costs), and associated benefits are estimated to increase to $38.6 million (fiscal year 1993 dollars). The discounted payback is 2.9 years, and the savings to investment ratio increased to 3.2.

The most visible change in the economic indicators of AIMS is the decrease in benefits from the Milestone I to the Milestone II document. The benefits calculated for Milestone I were based on the elements of work measurement standards that decreased as a result of potential AIMS implementation. However, the Milestone I analysis did not address the possibility that other elements of the work standard could increase as a result of AIMS implementation.

While these data cannot be compared to each other because each analysis was performed at different points in time of the development life cycle, some points are evident. Because AIMS investment costs were not formalized in an analysis between 1988 and 1993, functional managers may not have had a clear picture of the costs and benefits of AIMS over time. At the present time, the AIMS baseline appears to show that total investment will be recouped though system benefits.

Sensitivity analysis

A sensitivity analysis to the investment decision analyses was performed to determine the impacts of a change in the discount rate to reflect the rates provided in Appendix C of the most recent OMB Circular A-94. All analyses used in this analysis were re-run using a discount rate of 3.4 percent. As a result of this analysis, it was determined that lowering the discount rate will increase the NPV of the estimated net savings. As a result, investment estimates indicate that AIMS will be more profitable if the lower discount rate more accurately affected the costs of capital to the government. Using the lower discount rate, a discounted payback of 0.63 years, and a positive discounted net savings of $19.6 million are achieved during the period of analysis. The savings/investment ratio increases to 1.8. A summary of the financial indicators calculated using this rate is displayed below. A more thorough analysis is provided in Appendix D.

Exhibit 7-4
AIMS Economic Comparison - 3.4% Discount Rate ($ million)

	Milestone I	Milestone II	Milestone II Update	1993 Actual/Projected
Cost	$49.6	$31.1	$31.1	$15.5
Benefits	77.0	37.0	28.4	38.6
Savings	$27.3	$5.9	($2.7)	$23.1
Discounted Savings	$19.9	$6.4	($1.5)	$19.6
Payback (years)	8.0	7.3	N/A	3.3
Savings/Investment Ratio	1.6	1.4	0.9	3.4
Base Year	1988	1990	1990	1993
Sunk Cost Years	FY 85-88	FY 85-90	FY 85-90	FY 87-92

Recommendations

Throughout this economic analysis, we conducted an extensive documentation review and interview process. The documentation established a starting point for interviews with functional and technical personnel actively involved in the AIMS process at DLA. As our understanding, and appreciation of the complexity of AIMS has grown, we have been able to develop recommendations for further investigation and action. Our recommendations suggest areas where further analysis and scenario planning would provide increased value to the AIMS process and user community and could result in further cost and time savings.

Our recommendations span the spectrum of our analysis and include possibilities for further study, courses of action, and avenues for continued improvement within the scope of the AIMS program.

Reduce reliance on paper forms

By developing AIMS, DLA provided its inventory managers with an automated tool for making buy decisions. Although all information necessary to begin the RB process is available on AIMS, some centers are still reviewing and utilizing hard copy SSCSs. The IMs observed at DGSC were still using the SSCS cards and did not begin processing an RB until the SSCS was received. AIMS contains all data available from the hard copy SSCS, plus additional information required in the RB decision. Because IMs are performing their work using the manual cards and the system, IMs are actually spending more time on each buy than necessary.

Establish guidelines for cost estimating

A solid cost estimate, tied to the expected functionality of a proposed project, is a key beginning point for the development of an information system. Therefore, the methodology and documentation used to arrive at the cost estimate becomes important. Although some general parameters for information system cost estimating exist, both within and outside DLA, the Federal Government and the Secretary of Defense are placing more and more emphasis on initial cost estimates. By establishing guidelines for cost estimating, DLA would again be well prepared to deal with cost justification and would have greater confidence in the expected life cycle cost of a system. Some areas for consideration are:

- document the hardware environment of new system development
- identify and document the skills of in-house development and maintenance personnel
- document and monitor the functionality of the system under estimate

Establish guidelines for benefit accrual

DLA can benefit in numerous ways if positive attributes of a system can be both developed and presented within certain guidelines. During this analysis, it was observed that the methodology for quantifying and the presentation of savings related to reductions of lead time, have varied over time. Not only did the methodology and presentation vary when analyzing different systems, but also when comparing the same benefit for the same system at different points in time. Because a variety of events can lead to a reduction in lead time, more than one methodology would be appropriate. This idea can also apply to other types of benefits. For example, personnel savings have been developed and presented in various manners depending on the author, time frame, and cause of benefit.

If guidelines are developed, DLA will be better positioned to justify investments. A documented guideline carefully coordinated would be beneficial to DLA.

KPMG Peat Marwick

ECONOMIC ANALYSIS OF THE AUTOMATED INVENTORY MANAGER SUPPORT SYSTEM

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Appendix A
GOVERNMENT FURNISHED MATERIAL
AIMS

Title

AIMS ALT and Resource Savings, no date
AIMS Benefits to DISC, December 1, 1988
AIMS Computer Operation Manual, no date, Draft
AIMS Economic Analysis Update
AIMS Management Requirements, sections from the SAMMS Modernization, 7-84, updated 4-86
AIMS Post Deployment Report, Synergy, Inc., February 1, 1991
AIMS Post Deployment Report, Synergy, Inc., March 5, 1991
AIMS Preliminary Business Case, no date
AIMS: CIM Initiative and C&T Module report, Synergy Inc., July 1, 1991
Determine Stock Replenishment Recommended Buys Functional Description, no date
DISC ALT Data
DISC Letter dated 12/24/92, containing personnel data, job descriptions, and RB totals
DISC Management Data: RB volume and OALT
DLAM 4745.32 Vol. I, part 3, Chapter 8, draft, AIMS Functional Description, no date
DLAM 7041.1, "Economic Analysis", May 1985
DLAR 7041.1, "Economic Analysis and Program Evaluation for Resource Management", February 25, 1985
DoDI 7041.2, "Economic Analysis and Program Evaluation for Resource Management", October 18, 1972
DPSC Certification of AIMS, July 24, 1992
Draft Estimates of Recommended Buy Benefits for SAMMS I^3
Initial Major Information Systems Report (AIMS)
IOM: AIMS IPR Status, December 6, 1989
IOM: AIMS IPR Status, January 23, 1990
IOM: DMINS/Telecommunications requirements for RB Project, June 20, 1988
IOM: Non Impact Printing System Requirements, January 26, 1989
IOM: SARD for Work Station for SAMMS Projects, September 7, 1988
IOM: SARD for Work Station for SAMMS Projects, May 31, 1988
IOM: Workstation requirements for SAMMS Modernization RB Project, March 27, 1987

Memorandum of Meeting, AIMS Implementation Cadre Meeting, March 1, 1990, 3 enclosures

PA&E Draft Guidelines

Project Paper on AIMS, August 23, 1990

Project Paper on AIMS, February 1, 1987

Project Paper on AIMS, July 11, 1988

Project Paper on AIMS, March 9, 1990

Project Paper on AIMS, October 18, 1989

Project Paper on AIMS, September 6, 1991

Prototype Plan for SAMMS Modernization Recommended Buy Process: AIMS, November, 1987

SAMMs I^3 Benefit Analysis, Milestone II

Special Purpose Data for Procurement Action, Standard 2310, March, 1988

Special Purpose Data for Procurement Action, Standard 2310, September, 1991

Standard 2310 Work Counts by DSC for 1990 through 1992

Standard Composite Time Values by PLFA

Workstation Contract Data

ECONOMIC ANALYSIS OF THE AUTOMATED INVENTORY MANAGER SUPPORT SYSTEM

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AIMS List of Contacts

	Name		Office Symbol	Room #	Topic
	Sharie	Amron	DISC-OPM	Bldg 33	System/Standards
	Judy	Archer	DGSC		Supply Stats
	Ruby	Atwell	DPSSO	Bldg 33	Standards
	Pat	Brady	DISC-OPR	Bldg 3	Supply Data
	Shelly	Broussard	DLA-ZSM	3A675	System
	John	Bryant	DORO		CIT Workload Data
Col	J.	Carpenter	DLA-OM	Bldg 5 Dr10	C.I.T.
	Marcia	Chapen	DLA-ZRM	3A558	Cost data
	Vickie	Christensen	DLA-OM	Bldg 5 Dr10	CIT Workload Data
	George	Colborn	DISC-OPR	Bldg 3	Supply Operations
	Linwood	Connell	DSAC-OR		CDA
	Mark	Cunningham	DLA-CM	3D617	Actual Personnel Costs
	Will	Cutler	DGSC		Supply Stats
	John	DeSanto	DISC-Z	Bldg 3	HW Configuration-Lans
	Linda	Fields	DLA-ZSS	3A675	Hardware Maintenance
	Peggy	Fiore	DISC-OPM	Bldg 3	Supply Data/Standards
	Jeanne	Gerwitz	DLA-ZSS	Bldg 3	Project Oversight
	Peggy	Glasheen	DLA-CE	Bldg 3	Standards
	Joe	Green	DISC-Z		Hardware
	Carl	Gulley	DPSSO	Bldg 33	Standards
	Cheryl	Haines	DISC-RMO	Bldg 36	Lead Time
	Judy	Harrison	DLA-Z		Hardware Inventory Maintenance
	Alicia	Ingber	DISC-ALA	Bldg 5	System Concept
	Lou	Julg	DISC-RM	Bldg 36	Resource Data
	Sandra	King	DLA-ZSM	3A675	Project Oversight
	Dave	Lampe	DISC-AO	Bldg 5	Lead Time
	Tom	Lanagan	DORO	Bldg 33	Lead Time
	Tom	Lee	DGSC-O		Workload Data
	Don	Love	DGSC-OPR	Bldg 32-I	AIMS Functions
	Gerry	Osborne	DISC-Z		Hardware Requirements
	Lynne	Osborne	DGSC-O	Bldg 32	AIMS Processes
	Joe	Perez	DISC-OPR		System Concept/ Hardware
	Mike	Pouy	DLA-OSP	Bldg 4	Supply Policy/Lead Time
	Jan	Rider	DLA-LO	Bldg 3	COTR
	Stan	Rimdzius	DISC-RMO	Bldg 36	Lead Time
	Valerie	Shepard	DLA-K		Personnel Data
	Phil	Silas	DACO		Actual Costs
	Barbara	Standard	DLA-C	Bldg 3	Budgets
	Jessie	Thompson	DCSC		AIMS lead analyst
	Avis	Titcher	DISC-Z	Bldg 3	HW Configuration
	Tony	Tomasello	DISC-OPR	Bldg 3	Requirements
	Ken	Tomasello	DISC		DISC LAN data
	Kay	Vierra	DLA-OSS	4B260	Functional
	Ann	Weaver	DGSC-OPR	Bldg 32-I	AIMS Functions
	Lynne	Weber	DLA-OSS	4B260	Supply Operations
	Linda	Williams	DPSSO	Bldg 33	Standards
	Bernadine	Williams	DGSC		Inventory Manager

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DEFENSE LOGISTICS AGENCY
HEADQUARTERS
CAMERON STATION
ALEXANDRIA, VIRGINIA 22304-6100

29 JAN 1993

IN REPLY REFER TO DLA-DORO (Capt Dawson/DSN 695-4977)

SUBJECT: Analysis Support for SAMMS Enhancement Projects (DPAC, AIMS, ESEX)

TO: Peat Marwick
Mr. S. Daniel Johnson
2001 M. Street, N. W.
Washington, DC 20036

1. References:

a. Peat Marwick letter, 18 December 1992, regarding above subject.

b. Meeting between Peat Marwick & DLA-DORO, 14 January 1993 regarding above subject.

2. In responding to your request (Reference 1a), we have developed the workload estimates associated with purchase requests (PRs) for each Inventory Control Point (ICP). These historical work counts were derived from the All Active Contract File (ALLACF). They represent only those recommended buys (RBs) which survive in the system and become PRs. Provided at Enclosure 1 are the results of our data analysis for historical PRs.

3. The request for workload data dealing with the volume of standard supply control studies and the volume of RBs with reason codes by ICP is unavailable in our historical files. As discussed in referenced meeting, this type of workload data is available at each ICP for limited historical time periods. It is our recommendation that you seek these data from the ICPs.

4. With respect to your request for our office to update the dollar savings due to the decrease in lead time, we have updated these estimates. Provided at Enclosure 2 are the revised estimates for FY 91 and FY 92. These are based on the same total reduction in lead time (35 days) as was employed in the original study. As we discussed in our meeting, we have also conducted a sensitivity analysis on savings due to lead times as a function of the relative mix between Administrative Lead Time (ALT) versus Production Lead Time (PLT). Our conclusion, based on the use of the Industrial Commodity data, is that savings due to lead times are not sensitive to whether time is saved in PLT or ALT.

5. This completes our action on your request. If you have any questions regarding these findings, you may contact either Mr. Thomas Lanagan, (804) 279-4918 or Captain Edward Dawson, USAF, (804) 279-4977 at our office in Richmond.

Sincerely,

Jan Rider

2 Encl

JAN RIDER
Senior Study Director
for Economic Analysis

FY-89-92 VOLUME OF PURCHASE REQUESTS

Comm	FY 89		FY 90		FY 91		FY 92	
	Purchase Reqs	%	Purchase Reqs	%	Purchase Reqs	%	Purchase Reqs	%
C	334,576	0.29	307,634	0.30	338,536	0.31	266,653	0.29
E	194,088	0.17	172,551	0.17	173,193	0.16	144,231	0.15
G	225,430	0.20	218,332	0.21	235,495	0.21	206,976	0.22
I	200,805	0.18	181,656	0.18	183,506	0.17	153,031	0.16
M	162,432	0.14	129,323	0.13	141,554	0.13	138,810	0.15
T	29,948	0.03	24,922	0.02	24,256	0.02	22,557	0.02
DLA	1,147,279	1.00	1,034,418	1.00	1,096,540	1.00	932,258	1.00

TABLE A-1: FY-92 SAFETY LEVEL (SL) $ SAVINGS DUE TO REDUCED LEAD TIMES

Comm	Prob(BO)	#Req	BO Goal	Current System Constant	Reduced Lead Time System Constant	SL$ Current	SL$ w/Reduced Lead Time	SL$ Saved	SL$ Saved per Lead Time Day
C	0.17	3,691,069	630,909	267,954,832	244,280,784	5,389,000	3,657,000	1,732,000	49,486
E	0.09	2,552,242	239,177	214,148,240	195,507,568	14,657,000	10,495,000	4,162,000	118,914
G	0.17	2,613,423	446,671	325,669,888	297,203,456	10,687,000	7,398,000	3,289,000	93,971
I	0.11	5,486,319	615,119	302,130,688	277,941,248	20,910,000	16,162,000	4,748,000	135,657
M	0.09	1,412,918	124,338	131,001,520	113,120,112	8,227,000	5,472,000	2,755,000	78,714
T	0.14	1,539,173	210,824	1,310,794,496	1,226,820,860	145,943,000	122,599,000	23,344,000	666,971
DLA	0.16	17,295,144	2,798,573	2,551,699,664	2,354,874,028	205,813,000	165,783,000	40,030,000	1,143,714

TABLE A-1: FY-91 SAFETY LEVEL (SL) $ SAVINGS DUE TO REDUCED LEAD TIMES

Comm	Prob(BO)	#Req	BO Goal	Current System Constant	Reduced Lead Time System Constant	SL$ Current	SL$ w/Reduced Lead Time	SL$ Saved	SL$ Saved per Lead Time Day
C	0.13	3,738,903	468,140	286,074,880	262,331,344	9,803,000	6,873,000	2,930,000	83,714
E	0.07	2,780,638	205,289	221,371,104	202,594,832	23,369,000	17,160,000	6,209,000	177,400
G	0.13	2,747,752	358,826	378,953,984	346,256,384	22,399,000	16,300,000	6,099,000	174,257
I	0.11	5,633,787	626,590	329,272,576	304,910,336	24,617,000	19,196,000	5,421,000	154,886
M	0.09	1,469,063	126,383	192,647,872	168,818,096	8,106,000	5,249,000	2,857,000	81,629
T	0.20	1,965,461	388,553	1,449,325,312	1,357,031,170	84,893,000	71,224,000	13,669,000	390,543
DLA	0.12	18,335,604	2,198,329	2,857,645,728	2,641,942,162	173,187,000	136,002,000	37,185,000	1,062,429

ECONOMIC ANALYSIS OF THE AUTOMATED INVENTORY MANAGER SUPPORT SYSTEM

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AIMS Historical Economics
(3.4% discount rate)

	FY 85-88	FY 89	FY 90	FY 91	FY 92	FY 93	FY 94	FY 95	FY 96	FY 97	FY 98	FY 99	FY 00	Total	Excluding 1985-88	Excluding 1985-90
Incremental AIMS Cost (FY 88 $)	$0.2	$9.4	$6.1	$1.1	$1.1	$1.2	$6.2	$1.5	$1.1	$2.8	$4.3	$5.8	$1.1	$41.8	$41.6	$26.1
FY 93 $$	$0.2	$11.3	$7.2	$1.3	$1.3	$1.4	$7.4	$1.8	$1.3	$3.4	$5.1	$6.9	$1.3	$49.8	$49.6	$31.1
Milestone I Savings (FY 93 $)																
FTE				165.0	165.0	165.0	165.0	165.0	165.0	165.0	165.0	165.0	165.0	165.0		
Personnel Savings				$5.8	$5.8	$5.8	$5.8	$5.8	$5.8	$5.8	$5.8	$5.8	$5.8	$58.5	$58.5	
Lead Time (one time) - 2.8 days				6.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	6.6	$6.6	
Recurring Lead Time				1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	11.9	$11.9	
Total Benefits				$13.6	$7.0	$7.0	$7.0	$7.0	$7.0	$7.0	$7.0	$7.0	$7.0	$77.0	$77.0	
Net Savings/(cost)	($0.2)	($11.3)	($7.2)	$12.3	$5.8	$5.6	($0.4)	$5.3	$5.8	$3.6	$2.0	$0.1	$5.8	$27.1	$27.3	
Discounted Savings/(cost)		($11.1)	($6.9)	$11.3	$5.1	$4.8	($0.3)	$4.2	$4.5	$2.7	$1.4	$0.1	$3.9		$19.9	
Sunk cost years 1985-1988																
Milestone II Savings (FY 93 $)																
FTE				58.3	58.3	58.3	58.3	58.3	58.3	58.3	58.3	58.3	58.3	58.3		
Personnel Savings				$1.9	$2.1	$2.1	$2.1	$2.1	$2.1	$2.1	$2.1	$2.1	$2.1	$20.9	$20.9	
Lead Time (one time) - 2.4 days				5.6	0.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	6.1	$6.1	
Recurring Lead Time				0.9	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	9.9	$9.9	
Total Benefits				$8.4	$3.7	$3.1	$3.1	$3.1	$3.1	$3.1	$3.1	$3.1	$3.1	$37.0		$37.0
Net Savings/(cost)	($0.2)	($11.3)	($7.2)	$7.1	$2.4	$1.7	($4.3)	$1.3	$1.8	($0.3)	($2.0)	($3.8)	$1.8	($12.9)		$5.9
Discounted Savings/(cost)				$6.9	$2.3	$1.5	($3.8)	$1.2	$1.5	($0.2)	($1.5)	($2.8)	$1.3			$6.4
Sunk cost years 1985-1990																
Milestone II (Update) Savings (FY 93 $)																
FTE				60.0	60.0	60.0	60.0	60.0	60.0	60.0	60.0	60.0	60.0	60.0		
Personnel Savings				$2.0	$2.2	$2.2	$2.2	$2.2	$2.2	$2.2	$2.2	$2.2	$2.2	$17.8	$22.1	
Lead Time (one time) - 2.4 days				1.0	0.9	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.2	$2.2	
Recurring Lead Time				0.2	0.3	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	3.6	$4.1	
Total Benefits				$3.2	$3.5	$3.0	$2.7	$2.7	$2.7	$2.7	$2.7	$2.7	$2.7	$21.7		$28.4
Net Savings/(cost)	($0.2)	($11.3)	($7.2)	$1.9	$2.2	$1.6	($4.7)	$0.9	$1.4	($0.7)	($2.4)	($4.2)	$1.4	($21.4)		($2.7)
Discounted Savings/(cost)				$1.9	$2.1	$1.4	($4.2)	$0.8	$1.2	($0.6)	($1.9)	($3.2)	$1.0			($1.47)
Sunk cost years 1985-1990																

AIMS Actual/Future Costs and Benefits
(3.4% discount rate)

	FY 87	FY 88	FY 89	FY 90	FY 91	FY 92	FY 93	FY 94	FY 95	FY 96	FY 97	FY 98	FY 99	FY 00	FY 01	TOTAL	Total w/o sunk
Costs																	
Investment	$0.43	$5.10	$3.70	$2.93	$0.80	$1.73	$1.94	$2.47	$0.00	$0.33	$0.67	$1.32	$2.47	$0.00	$0.00	$23.90	$9.21
Recurring costs	0.01	0.15	0.48	0.93	1.07	1.05	1.05	0.91	0.91	0.92	0.91	0.43	0.35	0.36	0.48	9.99	6.31
Total Costs	$0.43	$5.25	$4.19	$3.85	$1.87	$2.78	$2.99	$3.38	$0.91	$1.25	$1.57	$1.75	$2.83	$0.36	$0.48	$33.89	$15.52
Costs (FY 93$$)	$0.54	$6.26	$4.80	$4.29	$1.98	$2.88	$2.99	$3.38	$0.91	$1.25	$1.57	$1.75	$2.83	$0.36	$0.48	$36.28	$15.52
Savings (FY 93$$)																	
Personnel						$4.10	$4.10	$4.10	$4.10	$4.10	$4.10	$4.10	$4.10	$4.10	$4.10	$41.00	$36.90
Lead time (one-time)						0.68	0.51	0.20								1.39	0.71
Lead Time (Recurring)						0.05	0.10	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11	1.04	0.99
Total Savings						$4.83	$4.70	$4.42	$4.21	$4.21	$4.21	$4.21	$4.21	$4.21	$4.21	$43.44	$38.60
Net Savings/(cost)	($0.54)	($6.26)	($4.80)	($4.29)	($1.98)	$1.95	$1.72	$1.03	$3.30	$2.96	$2.64	$2.46	$1.38	$3.85	$3.73	$7.15	$23.08
Discounted Savings/(cost)	($0.54)	($6.26)	($4.80)	($4.29)	($1.98)	$1.95	$1.69	$0.98	$3.03	$2.64	$2.27	$2.05	$1.11	$3.00	$2.81	$3.65	$19.58

KPMG Peat Marwick

ECONOMIC ANALYSIS OF THE AUTOMATED INVENTORY MANAGER SUPPORT SYSTEM

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(FY 88 $000)

Element	Alternative 2 Total	Excluding Sunk Costs	Alternative 0 Total	Excluding Sunk Costs	Incremental Total	Excluding Sunk Costs	
NON RECURRING							
Contractor Provided							
Program Management	$0	$0	$0	$0	$0	$0	0.00%
Hardware							
ADPE	123,606	110,886	16,400	13,800	107,206	97,086	54.90%
Connectivity	11,581	11,144	1,600	1,200	9,981	9,944	5.62%
Remotes	0	0	0	0	0	0	0.00%
Software							
Development	1,923	850	800	600	1,123	250	0.14%
Commercial	3,213	2,701	0	0	3,213	2,701	1.53%
Documentation	236	204	0	0	236	204	0.12%
Test/Evaluation	0	0	0	0	0	0	0.00%
Tech/Integration	110	90	0	0	110	90	0.05%
Other	1,315	815	0	0	1,315	815	0.46%
Subtotal	$141,984	$126,690	$18,800	$15,600	$123,184	$111,090	
Government Provided							
Program Management	7,163	5,692	5,520	4,140	1,643	1,552	0.88%
Hardware							
ADPE	2,214	0	2,214	0	0	0	0.00%
Connectivity	0	0	0	0	0	0	0.00%
Remotes	0	0	0	0	0	0	0.00%
Software							
Development	20,135	6,361	0	0	20,135	6,361	3.60%
Commercial	0	0	0	0	0	0	0.00%
Documentation	878	878	0	0	878	878	0.50%
Test/Evaluation	2,214	2,184	0	0	2,214	2,184	1.24%
Tech/Integration	3,391	3,298	0	0	3,391	3,298	1.87%
Other	18,718	8,022	0	0	18,718	8,022	4.54%
Subtotal	$54,713	$26,435	$7,734	$4,140	$46,979	$22,295	
Support Investment							
Site Preparation	$550	$350	$0	$0	$550	$350	0.20%
Initial Training	6,921	6,325	0	0	6,921	6,325	3.58%
Subtotal	$7,471	$6,675	$0	$0	$7,471	$6,675	
Total Non-recurring	$204,168	$159,800	$26,534	$19,740	$177,634	$140,060	
RECURRING							
Contractor SW Maintenance	$11,176	$8,747	$10,228	$7,828	$948	$919	0.52%
Government SW Maintenance	120,631	103,913	164,752	123,564	(44,121)	(19,651)	-11.11%
ADPE Maintenance	105,628	89,138	68,372	52,372	37,256	36,766	20.79%
Other							
ADP Supplies	32,000	24,000	32,000	24,000	0	0	0.00%
Recurring Training	38,898	33,726	19,984	14,988	18,914	18,738	10.60%
Personnel Operating Costs	221,189	165,892	221,189	165,892	0	0	0.00%
Total Recurring Costs	$529,522	$425,416	$516,525	$388,644	$12,997	$36,772	
Total Undiscounted Costs	$733,690	$585,216	$543,059	$408,384	$190,631	$176,832	100.00%

(FY 88 $000)

Alternative 2 Breakdown

Element	DPACS	AIMS	Post Award	Recipt Proc	Discr Proc	CTOL	Other	Total	W/O Other
NON RECURRING									
Contractor Provided									
Program Management	$0	$0	$0	$0	$0	$0		$0	$0
Hardware									
ADPE	34,029	19,977	4,983	1,764	3,264	40,193	19,396	123,606	104,210
Connectivity	4,399	3,501	674	239	441	227	2,100	11,581	9,481
Remotes	0	0	0	0	0	0	0	0	0
Software									
Development	1,123	0	0	0	0	0	800	1,923	1,123
Commercial	1,695	1,213	131	46	84	43	0	3,213	3,213
Documentation	117	62	24	9	16	8	0	236	236
Test/Evaluation	0	0	0	0	0	0	0	0	0
Tech/Integration	60	50	0	0	0	0	0	110	110
Other	1,315	0	0	0	0	0	0	1,315	1,315
Subtotal	$42,738	$24,803	$5,812	$2,058	$3,805	$40,471	$22,296	$141,984	$119,688
Government Provided									
Program Management	N/A	N/A	N/A	N/A	N/A	N/A	7,163	$7,163	$0
Hardware									
ADPE	0	0	0	0	0	0	2,214	2,214	0
Connectivity	0	0	0	0	0	0	0	0	0
Remotes	0	0	0	0	0	0	0	0	0
Software									
Development	N/A	N/A	N/A	N/A	N/A	N/A	20,135	20,135	0
Commercial	0	0	0	0	0	0	0	0	0
Documentation	0	0	0	0	0	0	878	878	0
Test/Evaluation	232	137	38	13	25	13	1,756	2,214	458
Tech/Integration	1,249	660	258	91	168	87	878	3,391	2,513
Other	0	0	0	0	0	0	18,718	18,718	0
Subtotal	$1,481	$797	$296	$104	$193	$100	$51,742	$54,713	$2,971
Support Investment									
Site Preparation	$300	$250	$0	$0	$0	$0	$0	$550	$550
Initial Training	2,638	1,353	501	177	328	169	1,756	6,921	5,165
Subtotal	$2,938	$1,603	$501	$177	$328	$169	$1,756	$7,471	$5,715
Total Non-recurring	$47,156	$27,203	$6,609	$2,340	$4,327	$40,740	$75,794	$204,168	$128,374
RECURRING									
Contractor SW Maintenance	$540	$410	$0	$0	$0	$0	$10,228	$11,178	$950
Government SW Maintenance	0	0	0	0	0	0	120,631	120,631	0
ADPE Maintenance	13,990	7,676	1,458	646	1,201	10,635	70,022	105,628	35,606
Other									
ADP Supplies	0	0	0	0	0	0	32,000	32,000	0
Recurring Training	9,544	5,002	1,788	691	1,277	618	19,984	38,903	18,919
Personnel Operating Costs	0	0	0	0	0	0	221,189	221,189	0
Total Recurring Costs	$24,074	$13,088	$3,246	$1,337	$2,478	$11,253	$474,054	$529,529	$55,475
Total Undiscounted Costs	$71,230	$40,291	$9,855	$3,676	$6,805	$51,993	$549,848	$733,698	$183,850
	38.7%	21.9%	5.4%	2.0%	3.7%	28.3%			100.0%

(FY 88 $000)

Alternative 0 Breakdown

Element	DPACS	AIMS	Post Award	Recipt Proc	Discr Proc	CTOL	Other	Total	W/O Other
NON RECURRING									
Contractor Provided									
Program Management	$0	$0	$0	$0	$0	$0	$0	$0	$0
Hardware									
ADPE	0	0	0	0	0	0	16,400	16,400	0
Connectivity	0	0	0	0	0	0	1,600	1,600	0
Remotes	0	0	0	0	0	0	0	0	0
Software									
Development	0	0	0	0	0	0	800	800	0
Commercial	0	0	0	0	0	0	0	0	0
Documentation	0	0	0	0	0	0	0	0	0
Test/Evaluation	0	0	0	0	0	0	0	0	0
Tech/Integration	0	0	0	0	0	0	0	0	0
Other	0	0	0	0	0	0	0	0	0
Subtotal	$0	$0	$0	$0	$0	$0	$18,800	$18,800	$0
Government Provided									
Program Management	N/A	N/A	N/A	N/A	N/A	N/A	5,520	$5,520	$0
Hardware									
ADPE	0	0	0	0	0	0	2,214	2,214	0
Connectivity	0	0	0	0	0	0	0	0	0
Remotes	0	0	0	0	0	0	0	0	0
Software									
Development	N/A	N/A	N/A	N/A	N/A	N/A	0	0	0
Commercial	0	0	0	0	0	0	0	0	0
Documentation	0	0	0	0	0	0	0	0	0
Test/Evaluation	0	0	0	0	0	0	0	0	0
Tech/Integration	0	0	0	0	0	0	0	0	0
Other	0	0	0	0	0	0	0	0	0
Subtotal	$0	$0	$0	$0	$0	$0	$7,734	$7,734	$0
Support Investment									
Site Preparation	$0	$0	$0	$0	$0	$0	$0	$0	$0
Initial Training	0	0	0	0	0	0	0	0	0
Subtotal	$0	$0	$0	$0	$0	$0	$0	$0	$0
Total Non-recurring	$0	$0	$0	$0	$0	$0	$26,534	$26,534	$0
RECURRING									
Contractor SW Maintenance	$0	$0	$0	$0	$0	$0	$10,228	$10,228	$0
Government SW Maintenance	0	0	0	0	0	0	164,752	164,752	0
ADPE Maintenance	0	0	0	0	0	0	68,372	68,372	0
Other									
ADP Supplies	0	0	0	0	0	0	32,000	32,000	0
Recurring Training	0	0	0	0	0	0	19,984	19,984	0
Personnel Operating Costs	0	0	0	0	0	0	221,189	221,189	0
Total Recurring Costs	$0	$0	$0	$0	$0	$0	$516,525	$516,525	$0
Total Undiscounted Costs	$0	$0	$0	$0	$0	$0	$543,059	$543,059	$0
	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%			0.0%

(FY 88 $000)

Incremental Cost Breakdown

Element	DPACS	AIMS	Post Award	Recipt Proc	Discr Proc	CTOL	Other	Total	W/O Other
NON RECURRING									
Contractor Provided									
Program Management	$0	$0	$0	$0	$0	$0	$0	$0	$0
Hardware									
ADPE	34,029	19,977	4,983	1,764	3,264	40,193	2,996	107,206	104,210
Connectivity	4,399	3,501	674	239	441	227	500	9,981	9,481
Remotes	0	0	0	0	0	0	0	0	0
Software									
Development	1,123	0	0	0	0	0	0	1,123	1,123
Commercial	1,695	1,213	131	46	84	43	0	3,213	3,213
Documentation	117	62	24	9	16	8	0	236	236
Test/Evaluation	0	0	0	0	0	0	0	0	0
Tech/Integration	60	50	0	0	0	0	0	110	110
Other	1,315	0	0	0	0	0	0	1,315	1,315
Subtotal	$42,738	$24,803	$5,812	$2,058	$3,805	$40,471	$3,496	$123,184	$119,688
Government Provided									
Program Management	0	0	0	0	0	0	1,643	$1,643	$0
Hardware									
ADPE	0	0	0	0	0	0	0	0	0
Connectivity	0	0	0	0	0	0	0	0	0
Remotes	0	0	0	0	0	0	0	0	0
Software									
Development	0	0	0	0	0	0	20,135	20,135	0
Commercial	0	0	0	0	0	0	0	0	0
Documentation	0	0	0	0	0	0	878	878	0
Test/Evaluation	232	137	38	13	25	13	1,756	2,214	458
Tech/Integration	1,249	660	258	91	168	87	878	3,391	2,513
Other	0	0	0	0	0	0	18,718	18,718	0
Subtotal	$1,481	$797	$296	$104	$193	$100	$44,008	$46,979	$2,971
Support Investment									
Site Preparation	$300	$250	$0	$0	$0	$0	$0	$550	$550
Initial Training	2,638	1,353	501	177	328	169	1,756	6,921	5,165
Subtotal	$2,938	$1,603	$501	$177	$328	$169	$1,756	$7,471	$5,715
Total Non-recurring	$47,156	$27,203	$6,609	$2,340	$4,327	$40,740	$49,260	$177,634	$128,374
RECURRING									
Contractor SW Maintenance	$540	$410	$0	$0	$0	$0	$0	$950	$950
Government SW Maintenance	0	0	0	0	0	0	(44,121)	(44,121)	0
ADPE Mainenance	13,990	7,676	1,458	646	1,201	10,635	1,650	37,256	35,606
Other									
ADP Supplies	0	0	0	0	0	0	0	0	0
Recurring Training	9,544	5,002	1,788	691	1,277	618	0	18,919	18,919
Personnel Operating Costs	0	0	0	0	0	0	0	0	0
Total Recurring Costs	$24,074	$13,088	$3,246	$1,337	$2,478	$11,253	($42,471)	$13,004	$55,475
Total Undiscounted Costs	$71,230	$40,291	$9,855	$3,676	$6,805	$51,993	$6,789	$190,639	$183,850
	38.7%	21.9%	5.4%	2.0%	3.7%	28.3%			100.0%

(FY 88 $000)

Incremental Cost Plus Other Breakdown

Element	DPACS	AIMS	Post Award	Recipt Proc	Discr Proc	CTOL	Total
NON RECURRING							
Contractor Provided							
Program Management	$0	$0	$0	$0	$0	$0	$0
Hardware							
ADPE	35,190	20,634	5,144	1,824	3,375	41,040	107,206
Connectivity	4,593	3,611	701	249	460	368	9,981
Remotes	0	0	0	0	0	0	0
Software							
Development	1,123	0	0	0	0	0	1,123
Commercial	1,695	1,213	131	46	84	43	3,213
Documentation	117	62	24	9	16	8	236
Test/Evaluation	0	0	0	0	0	0	0
Tech/Integration	60	50	0	0	0	0	110
Other	1,315	0	0	0	0	0	1,315
Subtotal	$44,092	$25,570	$5,999	$2,128	$3,935	$41,460	$123,184
Government Provided							
Program Management	637	360	88	33	61	465	$1,643
Hardware							
ADPE	0	0	0	0	0	0	0
Connectivity	0	0	0	0	0	0	0
Remotes	0	0	0	0	0	0	0
Software							
Development	7,801	4,413	1,079	403	745	5,694	20,135
Commercial	0	0	0	0	0	0	0
Documentation	340	192	47	18	32	248	878
Test/Evaluation	912	522	132	48	90	510	2,214
Tech/Integration	1,589	852	305	109	200	335	3,391
Other	7,252	4,102	1,003	374	693	5,293	18,718
Subtotal	$18,531	$10,441	$2,655	$984	$1,822	$12,546	$46,979
Support Investment							
Site Preparation	$300	$250	$0	$0	$0	$0	$550
Initial Training	3,318	1,737	595	213	393	665	6,921
Subtotal	$3,618	$1,987	$595	$213	$393	$665	$7,471
Total Non-recurring	$66,241	$37,998	$9,249	$3,325	$6,150	$54,671	$177,634
RECURRING							
Contractor SW Maintenance	$540	$410	$0	$0	$0	$0	$950
Government SW Maintenance	(17,094)	(9,669)	(2,365)	(882)	(1,633)	(12,477)	(44,121)
ADPE Mainenance	14,629	8,038	1,546	679	1,262	11,102	37,256
Other							
ADP Supplies	0	0	0	0	0	0	0
Recurring Training	9,544	5,002	1,786	691	1,275	617	18,914
Personnel Operating Costs	0	0	0	0	0	0	0
Total Recurring Costs	$7,619	$3,780	$967	$487	$904	($759)	$12,999
Total Undiscounted Costs	$73,860	$41,779	$10,217	$3,812	$7,054	$53,912	$190,634

AIMS Original I Cubed Incremental Cost Estimate

Constant FY 88 $000

Incremental AIMS Quantities	FY85-88	FY89	FY90	FY91	FY92	FY93	FY94	FY95	FY96	FY97	FY98	FY99	FY00
INVESTMENT:													
Hardware													
Workstations	33	1,118	0	0	0	33	1,118	0	0	0	33	1,118	0
workstations excessed	0	0	0	0	0	33	1,118	0	0	0	33	1,118	0
cum workstat owned	33	1,151	1,151	1,151	1,151	1,151	1,151	1,151	1,151	1,151	1,151	1,151	1,151
DMINS	0	2	3	0	0	0	0	0	0	2	3	0	0
DMINS excessed	0	0	0	0	0	0	0	0	0	2	3	0	0
cum DMINS owned	0	2	5	5	5	5	5	5	5	5	5	5	5
NIPS	0	39	1	0	0	0	39	1	0	0	0	39	1
NIPS excessed	0	0	0	0	0	0	39	1	0	0	0	39	1
cum NIPS owned	0	39	40	40	40	40	40	40	40	40	40	40	40
LANS	0	30	52	0	0	0	0	0	0	0	0	0	0

AIMS Original I Cubed Incremental Cost Estimate

Constant FY 88 $000

Element	FY85-88	FY89	FY90	FY91	FY92	FY93	FY94	FY95	FY96	FY97	FY98	FY99	FY00	Total
NON RECURRING														
Contractor Provided														
Program Management	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Hardware														
ADPE	123	5,652	2,314	0	0	122	4,332	5	0	1,320	2,431	4,332	5	20,634
Connectivity	0	1,135	1,776	0	0	0	0	0	0	256	444	0	0	3,611
Software														
Development	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Commercial	3	284	265	0	0	3	106	0	0	176	268	106	0	1,213
Documentation	1	20	0	0	0	1	20	0	0	0	1	20	0	62
Test/Evaluation	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Tech/Integration	0	10	15	0	0	0	0	0	0	10	15	0	0	50
Other	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Subtotal	$127	$7,101	$4,370	$0	$0	$126	$4,458	$5	$0	$1,762	$3,158	$4,458	$5	$25,570
Government Provided														
Program Management	$20	$69	$112	$29	$14	$14	$14	$14	$14	$14	$14	$14	$14	$360
Hardware														
ADPE	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Connectivity	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Remotes	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Software														
Development	3,018	615	780	0	0	0	0	0	0	0	0	0	0	4,413
Commercial	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Documentation	0	96	96	0	0	0	0	0	0	0	0	0	0	192
Test/Evaluation	1	232	204	0	0	1	32	0	0	8	13	32	0	522
Tech/Integration	6	310	96	0	0	6	214	0	0	0	6	214	0	852
Other	2,342	587	587	587	0	0	0	0	0	0	0	0	0	4,102
Subtotal	$5,387	$1,908	$1,875	$616	$14	$22	$260	$14	$14	$22	$33	$260	$14	$10,441

AIMS Original I Cubed Incremental Cost Estimate

Constant FY 88 $000

	FY85-88	FY89	FY90	FY91	FY92	FY93	FY94	FY95	FY96	FY97	FY98	FY99	FY00	Total
Support Investment														
Site Preparation	$0	$100	$150	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$250
Initial Training	37	1,467	233	0	0	0	0	0	0	0	0	0	0	1,737
Subtotal	$37	$1,567	$383	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$1,987
Total Non-recurring	$5,550	$10,576	$6,627	$616	$14	$148	$4,718	$19	$14	$1,784	$3,192	$4,718	$19	$37,998
RECURRING														
Contractor SW Maintenance	$0	$14	$36	$36	$36	$36	$36	$36	$36	$36	$36	$36	$36	$410
Government SW Maintenance	(5,361)	(1,779)	(1,943)	(587)	0	0	0	0	0	0	0	0	0	(9,669)
ADPE Mainenance	0	210	923	607	607	607	1,037	1,015	607	607	607	605	607	8,037
Other														
ADP Supplies	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Recurring Training	12	416	416	416	416	416	416	416	416	416	416	416	416	5,002
Personnel Operating Costs	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Recurring Costs	($5,349)	($1,138)	($569)	$472	$1,059	$1,059	$1,489	$1,467	$1,059	$1,059	$1,059	$1,057	$1,059	$3,781
Total Undiscounted Costs (FY 88$)	$202	$9,438	$6,059	$1,088	$1,073	$1,206	$6,207	$1,486	$1,073	$2,843	$4,251	$5,775	$1,078	$41,778
Total Undiscounted Costs (FY 93$)	$240	$11,260	$7,228	$1,298	$1,280	$1,439	$7,405	$1,773	$1,280	$3,392	$5,071	$6,889	$1,286	$49,842
Total Discounted Cost (FY 93$)	$240	$10,740	$6,268	$1,023	$918	$938	$4,385	$955	$627	$1,509	$2,051	$2,533	$430	$32,617

ECONOMIC ANALYSIS OF THE AUTOMATED INVENTORY MANAGER SUPPORT SYSTEM

CONTENTS

APPENDIX F
EXPECTED BENEFITS

This Appendix contains a summary of the benefits expected from the implementation of AIMS. These benefits were taken from an October 1991 DLA document entitled *Benefits Quantification for Enhancements to Selected Automated Information Systems.* In the 1991 benefits analysis, DLA documented which areas they felt AIMS would benefit. The expected benefits listed below helped to form a starting point in the benefit identification process.

Recommended Buy brings to the Item Manager on-line visibility and assists the Item Manager by re-computing buy quantities automatically, accounting for information which was not available to the system when the recommended buy was produced. AIMS will provide on-line War Reserve draw-down as well as on-line help for processing personnel. In addition, AIMS will provide archival of data which will reduce filing and research time as well as provide an improved audit trail. Government Furnished Material (GFM) information, which is presently very cumbersome to access, will be on-line in AIMS. AIMS will prioritize IM workload which will eliminate the time IMs spend presently sorting Supply Control Studies. AIMS will provide the electronic interface between IMs and their supervisors as well as among supervisor levels. This will reduce the time and manual effort presently spent in moving these studies. AIMS will provide more efficient interfaces with Contracting for selective releases which will provide for the further reduction in ALT.

On-line visibility of data

On-line visibility of data will eliminate the time it takes to sort and distribute the recommended buys as currently done. Currently, this is done manually. This will reduce Administrative Lead Time (ALT) which will reduce safety levels which, in turn, will reduce the inventory on hand. Elimination of the paper reports will reduce the paper costs and the files needed to store the paper.

On-line processing of data

On-Line processing of data will eliminate the need for the Item Managers (IMs) to transcribe data on to data input sheets and cards. This will also eliminate the need for clerks to input data. Since there will be on-line validation of input, the time that it now takes for a violation to come out and be re-input will be virtually eliminated. This will reduce ALT which will reduce safety levels which in turn will reduce inventory on hand.

Simulation

Simulation will allow the IM to perform mathematical calculations that the IM performs manually now using a calculator. It will thus save the IM time and eliminate mathematical errors the IM might make. In addition, it will reduce the need for calculators on each desk.

Automating prioritization of item manager workload

Automating the prioritization of workload will allow the IM to rank actions so that the actions with the greatest impact on customer support can be

accomplished first. This will also eliminate the need for IMs to sort through large volumes of Supply Control Studies to find and sort the Recommended Buys (RBs) thus, reducing their workload.

Providing current data

Providing the IM with current data will allow the IM to make better informed and timely buy decisions. At present, the stock on hand situation may have changed between the time the item reaches reorder point (ROP) and the time the IM actually works the study. These changes can be additional demands which may cause the IM to under-buy. This may lead to repetitive buys in a short period of time. There could also be changes in the inventory on hand position such as the gaining of stock through inventories or through stock transfers or through customer returns. These instances of inventory gains will either reduce the amount of stock to be purchased or delay the stock buy altogether.

Electronic interface

RBs are physically carried between IMs and various levels of supervision to obtain approval due to various levels of approval authority. The electronic interface will enable the RB to be transferred electronically. This will reduce workload and eliminate the time it takes to pass the RB through various levels of supervision. This should also decrease the amount of time it takes to obtain all levels of approval, and thus reduce ALT (safety level and stock on hand). In addition, supervisors will be able to review the IM's work and thus be able to spot where improvement is needed.

Providing electronic interfaces with contracting in a data base environment will allow RB action, which has been approved, to move immediately to contracting, where it will create a purchase request (PR). Currently, the RB waits until the next Requirements cycle is run before it is passed to procurement, and then the next cycle must run before generating a PR. Thus, this electronic interface will reduce ALT.

ECONOMIC ANALYSIS OF THE AUTOMATED INVENTORY MANAGER SUPPORT SYSTEM

CONTENTS

AIMS Actual/Future Costs

INVESTMENT:	FY87	FY88	FY89	FY90	FY91	FY92	FY93	FY94	FY95	FY96	FY97	FY98	FY99	FY00	FY01
Hardware															
Workstations	33	1118	0	0	0	290	0	861	0	0	290	0	861	0	..
Workstations escalated	0	0	0	0	0	290	0	861	0	0	290	0	861	0	0
cum workstat owned	33	1151	1151	1151	1151	1151	1151	1151	1151	1151	1151	1151	1151	1151	1151
DMENS	0	1	0	6	0	0	0	0	0	1	0	4	0	0	0
DMENS escalated	0	0	0	0	0	0	0	0	0	1	0	4	0	0	0
cum DMENS owned	0	1	1	7	7	7	7	7	7	7	7	7	7	7	7
NIPS	0	0	38	0	0	0	0	39	0	0	0	0	39	0	0
NIPS escalated	0	0	0	0	0	0	0	39	0	0	0	0	39	0	..
cum NIPS owned	0	0	38	38	38	38	38	38	38	38	38	38	38	38	38
LANS	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
cum LANS owned	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

AIMS Actual/Future Costs

(Actual Costs are in then year dollars, FY 93 and on are in FY 93 dollars)

INVESTMENT	FY87	FY88	FY89	FY90	FY91	FY92	FY93	FY94	FY95	FY96	FY97	FY98	FY99	FY00	FY01	TOTAL TO DATE	TOTAL
Hardware																	
DMNS	$0	$668,000	$80,000	$2,264,000	$172,838	$271,751	$0	$0	$0	$285,762	$0	$1,143,048	$0	$0	$0	$3,456,589	$4,885,390
Workstations	$121,000	$3,354,000	$0	$0	$0	$792,570	$0	$1,982,022	$0	$0	$667,580	$0	$1,982,022	$0	$0	4,267,570	$8,899,192
NIPS	$0	$0	$466,000	$0	$0	$0	$0	$492,804	$0	$0	$0	$0	$492,804	$0	$0	466,000	1,451,608
LANS	$0	$0	$2,327,000	$160,000	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	2,487,000	2,487,000
subtotal																$10,677,159	$17,723,201
Software																	
Development-Contractor	$13,000	$0	$0	$0	$49,000	$223,948	$0	$0	$0	$0	$0	$0	$0	$0	$0	$285,948	$285,948
Development-Gov't	$294,305	$979,958	$830,421	$492,777	$576,503	$276,200	$1,711,107	$0	$0	$0	$0	$0	$0	$0	$0	3,450,163	5,161,271
Commercial (workstation)	$0	$0	$0	$6,300	$2,500	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	8,800	8,800
Commercial (DMNS)	$0	$0	$0	$0	$0	$49,837	$0	$0	$0	$45,159	$0	$180,636	$0	$0	$0	49,837	275,632
s/w site license	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	0	0
subtotal																$3,794,748	$5,731,650
Software Documentation																	
Gov't system documentation	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Commercial documentation (w/s)	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	0	0
subtotal																$0	$0
Test and Evaluation																	
Gov't software	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
T & E (workstations)	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	0	0
T & E (DMNS)	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	0	0
subtotal																$0	$0
Tech/Integ Support																	
Tech & Integ Supp (DMNS)	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Tech & Integ Supp (worksta)	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	0	0
workstation s/w h/w integrat	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	0	0
subtotal																$0	$0
Program Management																	
Gov't Program Management	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Other																	
Non-SAMMS related DSAC staff	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Site Preparation	$0	$100,000	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$100,000	100,000
Initial training costs	$0	$0	$0	$4,700	$0	$90,000	$87,000	$0	$0	$0	$0	$0	$0	$0	$0	94,700	181,700
Travel	$0	$0	$0	$0	$0	$26,000	$140,000	$0	$0	$0	$0	$0	$0	$0	$0	26,000	166,000
subtotal																$220,700	$447,700
TOTAL INVESTMENT	$428,305	$5,101,958	$3,703,421	$2,927,777	$800,841	$1,730,306	$1,938,107	$2,474,826	$0	$330,921	$667,580	$1,323,684	$2,474,826	$0	$0	$14,692,608	$23,902,551

AIMS Actual/Future Costs

(Actual Costs are in then year dollars. FY 93 and on are in FY 93 dollars)

	FY87	FY88	FY89	FY90	FY91	FY92	FY93	FY94	FY95	FY96	FY97	FY98	FY99	FY00	FY01		TOTAL
Recurring Costs																	
Govt Software Maintenance	0	0	0	0	67,870	67,870	67,870	67,870	67,870	67,870	67,870	67,870	67,870	67,870	67,870	135,740	[illegible]
software maintenance (DMINS)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
software maint commercial	0	0	0	0	0	0	0	0	0	0	1,222	1,222	6,110	6,110	6,110	0	20,775
Hardware Maintenance	0	96,000	100,800	529,200	600,000	600,000	600,000	600,000	600,000	480,000	489,228	9,228	46,139	46,139	46,139	1,926,000	4,942,874
DMINS	6,050	50,750	173,750	174,960	174,960	153,540	153,540	39,629	47,554	146,655	118,921	118,921	33,379	40,055	139,156	734,010	1,571,820
Workstations	0	0	23,300	23,300	23,300	27,960	27,960	0	0	24,640	29,568	29,568	0	0	24,640	97,860	234,237
NIPS	0	0	186,160	198,960	198,960	198,960	198,960	198,960	198,960	198,960	198,960	198,960	198,960	198,960	198,960	783,040	2,573,680
LANS	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
ADP Supplies	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Recurring Training Costs	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL RECURRING COST	$6,050	$146,750	$484,010	$926,420	$1,065,090	$1,048,330	$1,048,330	$906,459	$914,384	$918,126	$905,769	$425,769	$352,458	$359,134	$482,875	$3,676,650	$9,989,955
GRAND TOTAL:	$434,355	$5,248,708	$4,187,431	$3,854,197	$1,865,931	$2,778,636	$2,986,437	$3,381,285	$914,384	$1,249,047	$1,573,349	$1,749,453	$2,827,284	$359,134	$482,875	$18,369,258	$33,892,506

ECONOMIC ANALYSIS OF THE AUTOMATED INVENTORY MANAGER SUPPORT SYSTEM

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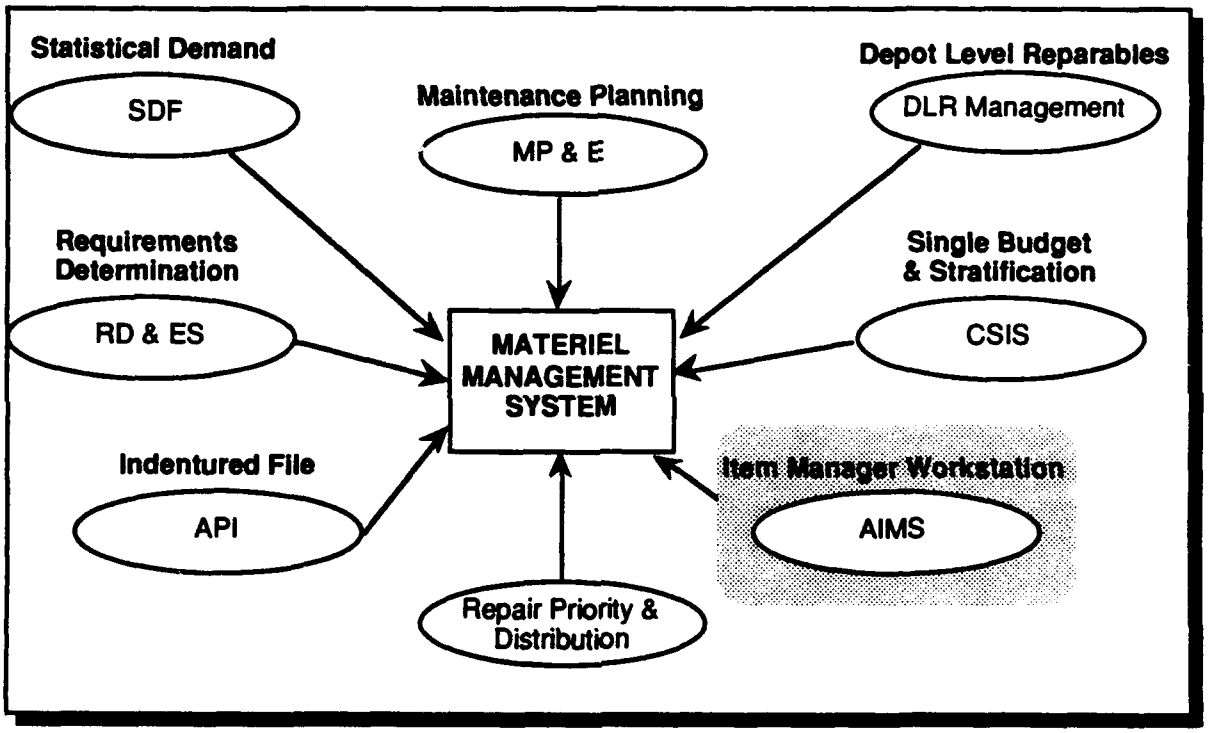
APPENDIX H
Future Considerations

AIMS will undergo several changes as it becomes part of the migration system for materiel management. The migration system is supposed to serve as the prelude to a standard system; until a standard system is adopted, procured, or designed, the migration system should be used by the DoD components. The migration system will be a combination of functionality from eight different systems of which AIMS is one. Exhibit H-1 below illustrates the possible components of the future system.

Exhibit H-1
Materiel Management System Components



Functionality

In order to support an initial operating site, AIMS will become part of the total Requirements Determination Process. The following functions, which are not currently part of AIMS, may be included in the standard DoD system:

- process recommended procurements or buys for reparable and indentured items as well as for consumables.
- process recommended disposals, redistributions, and contract terminations.
- process items that have indicators for customer returns, front-end or final asset screening, and all other indicators.

AIMS is envisioned to become the basis of the standard IM workbench. AIMS functions will work in conjunction with the various other applications to complete all tasks related to IM workload. The AIMS database will be populated by data extracted from the Requirements Determination and Execution System (RD&ES) accessing the data that support the

Requirements Data Bank (RDB). The transactions that are generated following an IM decision will return to update the RD&ES and the RDB database. AIMS will also interface with the Statistical Demand Forecast (SDF) application. SDF allows the user to do 'what if' simulations and select the best forcasting method for items. AIMS will pass data to the Maintenance Planning and Execution (MP&E) system. The MP&E system allows the IM to plan repairs including repairs budgeting and funds tracking. AIMS may provide data to support the Central Secondary Item Stratification (CSIS) process. This application provides input for the budget/POM processes. AIMS may also interact directly with the Distribution and Repair in Variable Environments (DRIVE) system. It functions to optimize weapon system availability and helps to prioritize repair and distribution of weapon systems. In addition, a Depot Level Reparable (DLR) management system may be added.

Costs

As documented in the body of this report, costs are currently being incurred to reengineer AIMS in order to port the system from Unify to Oracle. The JLSC will provide additional funds to add functionality to the baseline AIMS system. The extent of required functionality has not yet been defined by the services (the customer) and therefore no reliable cost estimate exists. However, additional investment to move from baseline AIMS to the target system can be divided into two major categories: software development and hardware acquisition.

Software development will be required to add functionality to the baseline. Once the user requirements are defined, a software costs estimate can be performed. Likewise, analysis of the current state of technology should be performed for the user community. The results of this analysis will aid the JLSC in determining its hardware requirements and therefore, its hardware investment costs.

Conclusion

The AIMS system that was originally designed to meet DLA requirements forms the foundation on which the future target system will be based. Although the exact functions of the target system have not yet been defined, it is clear that the new DoD standard system will be an outgrowth of today's AIMS. The future system will result in additional system costs for development, but should also yield additional benefits beyond those demonstrated by the existing AIMS system.

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13. ABSTRACT *(Maximum 200 words)*

The Standard Automated Materiel Management System (SAMMS) is the AIS that DLA's Defense Supply Centers use to manage wholesale inventories of all assigned commodities other than fuels and subsistence. SAMMS has several satellite systems, three of which are partially implemented, and these particular projects required economic analysis updates. The three systems are the Emergency Supply Expert (ESEX) System, the Automated Inventory Manager Support (AIMS) System, and the DLA Pre-Award Contracting System (DPACS).

The heart of the ESEX system is an automated voice response system to handle customer inquiries. The AIMS system processes recommended buys and DPACS primary workload includes purchase requests.

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